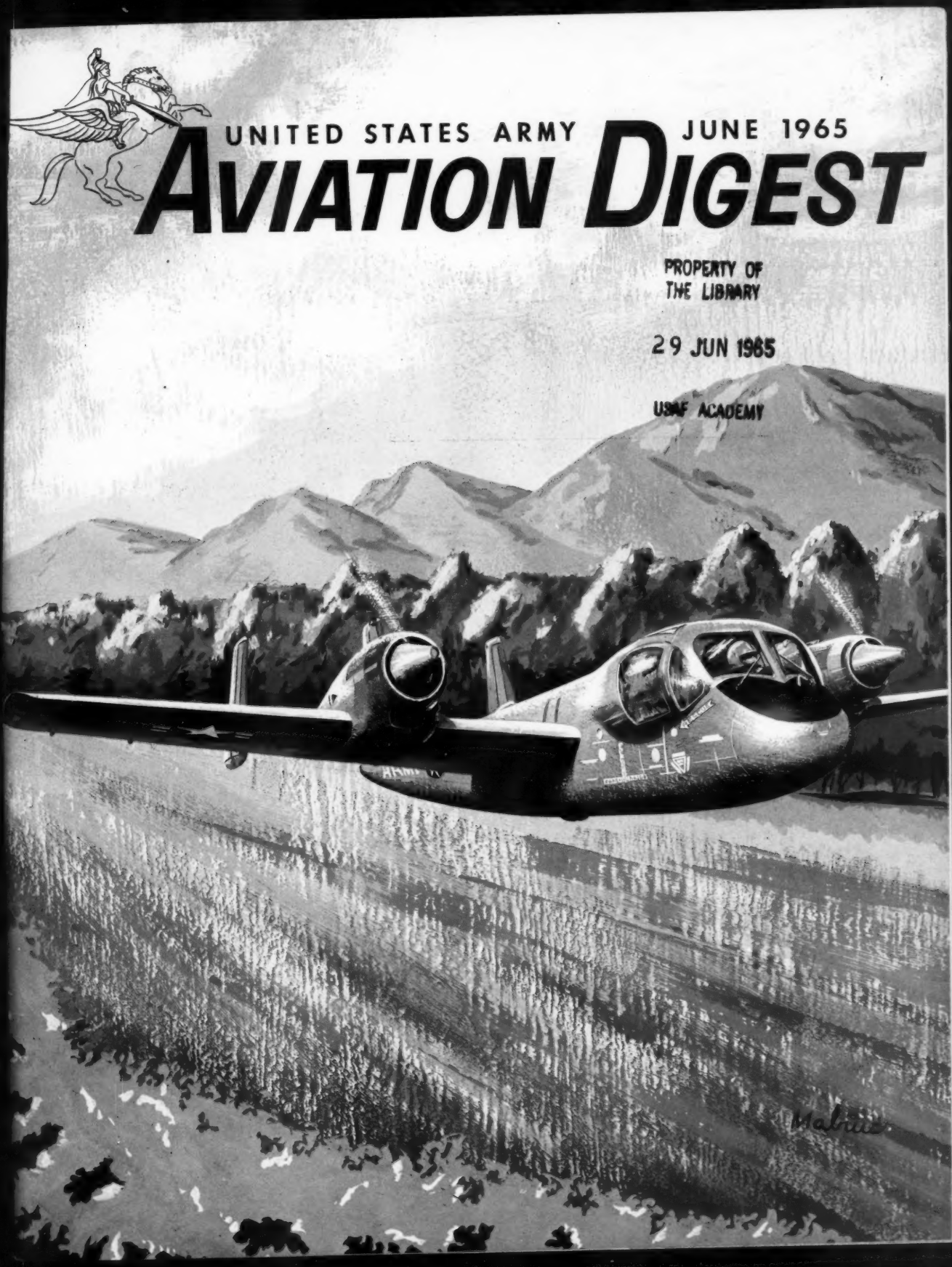
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UNITED STATES ARMY AVIATION DIGEST

JUNE 1965 VOLUME 11 NUMBER 6

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"...worked as a team" Back Cover

HAPPY BIRTHDAY!

Youthful, vigorous and able might best describe Army Aviation as it turns "23" this month. Despite a precarious debut in 1942, Army Aviation's capabilities have since been recognized throughout the Army. Today it is an indispensable member of the Army's *first team*. Congratulations!

The mission of the U. S. ARMY AVIATION DIGEST is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine, and other related data.

The DIGEST is an official Department of the Army periodical published monthly under the supervision of the Commandant, U. S. Army Aviation School. Views expressed herein are not necessarily those of Department of the Army or the U. S. Army Aviation School. Photos are U. S. Army unless otherwise specified. Material may be reprinted provided credit is given to the DIGEST and to the author, unless otherwise indicated.

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Use of funds for printing this publication has been approved by Headquarters, Department of the Army, 29 December 1964.

Active Army units receive distribution under the pinpoint distribution system as outlined in AR 310-1, 20 March 62, and DA Circular 310-57, 14 March 63. Complete DA Form 12-4 and send directly to CO, AG Publications Center, 2800 Eastern Boulevard, Baltimore, Md. For any change in distribution requirements, merely initiate a revised DA Form 12-4.

National Guard and Army Reserve units submit requirements through their state adjutants general and U. S. Army Corps commanders respectively.

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Demands

of the

Aviation Career

Lieutenant Colonel William R. Mathews

AFTER satisfactorily completing an aviation assignment, Captain A and Captain B were assigned to ground duty.

Captain A, an aviator assigned as an artillery battery commander, did a fine job. His battery was high in the division in battery tests, his unit was an honor battery, received superior on annual IG and command maintenance inspections. After having the unit a year, Captain A received an outstanding efficiency report.

Captain B, an aviator for seven years, had never served in an artillery unit. When assigned as an artillery battery commander, he seemed to have difficulty from the first in running his unit. Discipline

was a problem. Maintenance was poor. Inspection ratings were barely satisfactory. Training tests were passed only after initial failure. After six months Captain B was relieved and assigned to a new unit where he managed to improve, but he still had difficulty. His efficiency reports were below average. Striving to make good on his assignment, he let his flight proficiency slip—failed to get his minimums. Eventually he was relieved from flight status due to lack of potential.

Obviously one officer aviator was able and competent, the other bumbling and unprepared. Why did one aviation officer succeed while the other failed so completely? Was it the fault of the individual or the system? Actually it was both. It is a demonstrable fact that the quality officer does well in any assignment commensurate with his rank and *substandard Army Aviators are only rationalizing their own insufficiency by seeking refuge in blaming the inordinate demands of the system for their failures.*

Some attrition in personnel in the Army Aviation program is healthy and essential. Mediocrity cannot be tolerated in a program in which the officer has such intimate responsibility for the safety of the lives of crew members and passengers, and where the slightest omission in attention to details may result in disaster. The weak or lazy officer should be eliminated. *On the other hand, the individual who is limited by lack of training or experience should be assisted in every possible way.*

Dual requirements of branch and Army Aviation demand maximum use of the time available in a single military career. In each successive assignment the officer aviator, like his nonrated contemporary, must clearly demonstrate his professional competency to excel in whatever tasks he is required to perform. The aviator's failure to recognize this fact may inhibit opportunity for promotion and higher level schooling or cause release from flight status for substandard performance or lack of potential.

Dual qualification is a requirement we must presently recognize and train for. To avoid becoming a jack of all trades and master of none, an aviator can take numerous actions to prepare himself to meet the dual requirements of an aviation career. The field grade officer may use the opportunities to actually enhance his career by proving himself in a variety of assignments. These actions by the individual *can be supplemented by a long range DA program to restrict the number of commissioned aviators in the lower grades by increased use of warrant officer aviators.*

Col Mathews is assigned to the office of the Director of Instruction, USAAVNS, Ft Rucker, Ala.

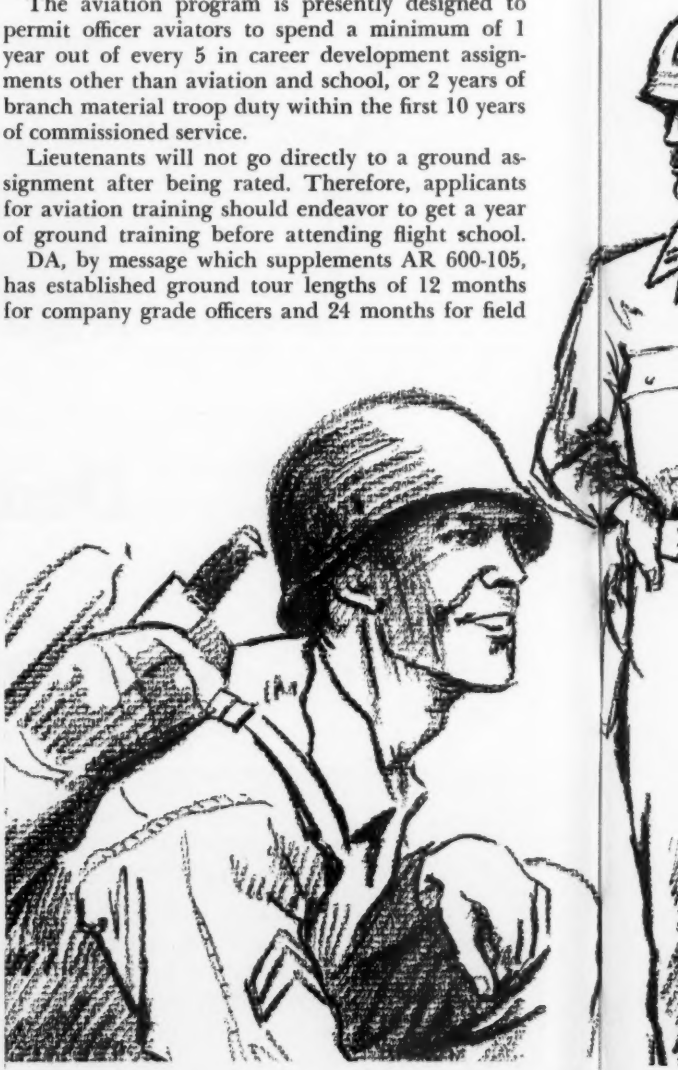
DEPARTMENT OF ARMY POLICY

AR 600-105, Army Aviation Officer Career Program, has been revised and was published on 22 September 1964 by Department of the Army. The major changes in the revised AR relate to categories of assignments and expansion of career development assignments outside of aviation. Categories I through IV are now designated A through C, with old categories I and II combined in the new category A. Category B, previously category III, branch assignments, allows expansion of this category to branch immaterial assignments as well.

The aviation program is presently designed to permit officer aviators to spend a minimum of 1 year out of every 5 in career development assignments other than aviation and school, or 2 years of branch material troop duty within the first 10 years of commissioned service.

Lieutenants will not go directly to a ground assignment after being rated. Therefore, applicants for aviation training should endeavor to get a year of ground training before attending flight school.

DA, by message which supplements AR 600-105, has established ground tour lengths of 12 months for company grade officers and 24 months for field



grade. The message in effect maintains a previously announced 12 month maximum ground tour for company grade aviators while lifting the one year restriction for field grade to allow increased assignment in higher level staff positions for career development.

The DA action has been taken at least in part to alleviate a shortage of company grade officers and an overage of field grade. Figure 1 illustrates the grade imbalances that exist at present for a hypothetical aviator requirement of approximately 8,000.

CONSEQUENCES OF THE AVIATION CAREER

In face of current imbalances, reports indicate that the Army is asking for 3,000 new pilots over the currently estimated strength of 8,000. The additional requirement is necessary, so authoritative sources say, regardless of air assault tests. With this expansion, what are career considerations for the Army Aviator?

Is the company grade aviator to be relegated to full-time aviation duty while field grade aviators are placed on ground duty based strictly on requirements of the command concerned? What is the effect of long periods of aviation duty on the career of company grade officers with little opportunity for maintaining branch qualification? Are the excess field grades to be held in aviation positions until the proposed expansion materializes? What will happen to aviators excess to their grade authorization when the current aviator shortage is alleviated? These and other questions occur to the conscientious aviator.

PRESENT EFFECTS OF DUAL REQUIREMENTS

The aviation career program from a DA viewpoint has the best of intentions, and to quote one source: "It is a recorded fact that during the past decade the goal of dual qualification has been met by an increasing number of career aviators." For the individual, however, problems are arising frequently as Army aircraft become more complex and branch qualification more difficult in an already technical Army. The Army Aviator is really pursuing two careers. Experience reveals that problems encountered by the individual aviator force him to recognize the following:

An aviation position appropriate to the grade held may not exist at some future date.

Assignment opportunities not productive to development of either career branch qualification or aviation technical qualifications must be foregone.

Opportunities for advanced civil schooling may not be available.

These effects are intensified by the following additional factors:

• Shortage in company grade. A company grade aviator shortage has existed in varying degrees since Korea or advent of ROCID, ROCAD, and ROAD that almost prohibits aviator branch assignments below grade of captain.

• Overages in field grade. An overage in field grade in the Army Aviation program is imminent.

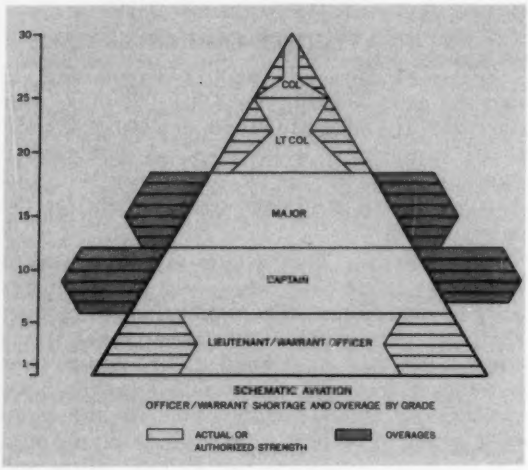


Figure 1

Current distribution of aviator assets tend to accent this developing program. One overseas command in 1964 had approximately 80 excess majors. As each new promotion list is published, it becomes apparent that the problem will become more aggravated in the future.

One consequence of an excess number of field grade aviators in an overseas command is that many authorized TOE positions for field grade, such as battalion executive officer or S-3, are vacant while an aviator major performs duty in a cockpit position. Commanders then, being realistic, divert aviator resources to an executive officer slot or S-3 position on verbal orders or a part-time basis with all the ramifications of such a situation.

• PCS limitations. The limitation of one year on ground duty for aviators further aggravates the problem. For example, an aviator completes his year of ground duty and is eligible for reassignment. However, due to PCS restrictions he cannot be moved. The result is that a captain or major aviator may move from company/battery commander or battalion S-3 to flight section commander in an artillery battalion or just an aviator position in a flight detachment pending PCS authority.

EFFECT OF LONG INITIAL TRAINING

The time required to train an aviator further magnifies the problem for the individual. Ideally, all commissioned aviators should have one year branch material duty before initiating flight training, which is normally the policy for Regular Army officers. With the present aviator shortage, a considerable percentage of aviator trainees begin training immediately after being commissioned.

Assuming an officer comes to the Aviation School directly after being commissioned, a minimum of 32 weeks is required for rotary wing training and 34 weeks for fixed wing training. If a graduate of one of these courses is to receive further training in the OV-1, CV-2, or CH-47, we must add from 6 to 7 weeks to his training time. We can expect then under ideal circumstances that the average officer aviator will have 10 months to a year's time in grade before arriving at his first unit.

Ideally, an officer should be promoted at present upon completion of active commissioned service as follows:

2/Lt – 1/Lt	1½ years
1/Lt – Capt	4-5 years
Capt – Major	10-12 years
Major – Lt Col	16-18 years

A second lieutenant aviator then might expect to serve only 6 months in an aviation unit before promotion to first lieutenant or 36 months before promotion to captain. The present DA policy is for company grade aviators to complete an initial 3 years of aviation utilization upon completion of flight training and 2 years of branch material duty in the first 10 years of service.

Based on this policy, an officer without prior branch material duty can expect to be a captain before he can perform a ground duty tour. As an aviator, if he performs ground duty earlier, he is failing to develop aviation experience and reinforce school training with practical application; if he performs ground duty later he may not be qualified. For this reason the officer aviator must not operate in an intellectual and professional vacuum during these formative years. Normal assignment of lieutenant aviators to TOE aviation units affords opportunity for the aggressive and alert young officers to develop knowledge of the basic roles, missions, and employment of division level combat and combat support activities.

STOPGAP SOLUTIONS

With an overall shortage of aviators, the personnel programmers may ask, "Is there any other solution?" We have to fill positions with the aviators available. So what if an officer serves in a position not calling for his grade? You can always make a remark on his efficiency report to the effect, "This officer is serving in a position calling for less than his grade due to PCS limitations."

On first glance this solution may appear satisfactory. However, if we recognize the fact that the narrative portion of the efficiency report achieves paramount significance in the present system of

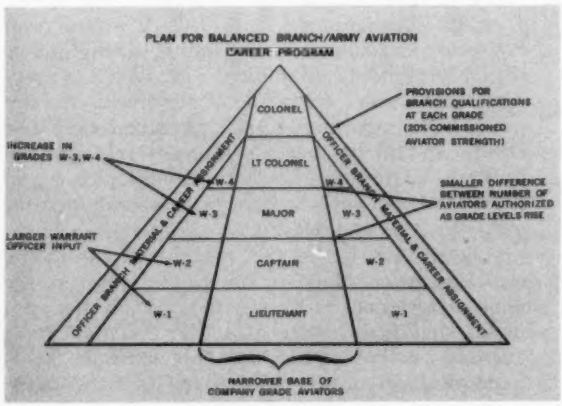
officer ratings, we can ask several questions when evaluating the report, but primarily, "Why couldn't this man get a job commensurate to his rank? Couldn't he sell himself well enough for someone to get a PCS for him?" These and other questions automatically arise. If you were considering an officer for assignment or recommending an officer for promotion or higher level schooling, would you recommend an officer serving in a position calling for a lesser grade?

A tendency exists for the average aviator to look at the grade of aircraft commanders in the other services and say, "They use many majors, lieutenant colonels, or equivalent rank officers as aircraft commanders, why shouldn't the Army?" This point will probably be argued for years; however, we have only to compare the responsibilities of Army Aviators in cockpit positions with those of a major or lieutenant colonel performing in the capacity of battalion S-3 or battalion CO in an armored, infantry or artillery battalion. Cockpit duties are hardly commensurate. When we consider commanders in nuclear weapon delivery units, or other specialized staff positions, it becomes even more apparent, at least to our nonrated contemporaries, that responsibility alone provides little justification for higher grade in a cockpit position.

CORRECTIVE ACTION FOR COMPANY GRADE

If we assume that an aviator in a cockpit position can fly an average of 25 hours per month (there may be exceptions), the average flying time that he can be reasonably expected to amass in a 10 year period or by the time he might be expected to be promoted to major is 3,000 hours. If he performs a command or staff assignment in this period, the total will be reduced by about 200 hours per year. After an officer is promoted to major and occupies a staff or command position, with rare exception 80-100 hours proficiency time is the most flying experience he will attain annually.

Figure 2



The aviator then should make every effort to fly the maximum time possible in the early years of his aviation career. Assignment from a company or battery to a cockpit position should be recognized as an opportunity to further his flying experience. Command should be accepted at every opportunity, but prestige of command should not allow an aviator in the early stages of his career to be distracted from perfecting his ability to fly. A high level of proficiency early in an aviator's career will allow for rapid requalification later, especially after extended periods of ground duty.

Simultaneously with the early emphasis on flight proficiency, branch qualification must begin. Flying 25 hours per month means less than an hour per day. Time available must be used to the best possible advantage. This paradox must be resolved by the aviator.

Several actions can be taken by both the aviation unit commander and the individual aviator to reduce the impact of this situation. They include:

Assignment of additional duties at every opportunity as supply officer, communications officer, courts and boards officer, survey officer, etc.

Assignment of study projects which require research and analysis, writing, and presentation of proposals.

Attachment when possible to a variety of combat arms or combat support units, as appropriate, for short periods.

Assignment of requirements for development of operations plans and training programs.

Participation in an aggressive unit training program on a level suitable for officers.

Completion of correspondence courses and self-study programs.

LONG RANGE SOLUTION

Many factors should be considered in a long range program to eliminate the problems of aviation career planning; however, consideration should include as a minimum: total aviator requirements, skill level necessary, branch qualification, average time in grade, ratio of officer to warrant officers, etc. Drastic or radical steps must be considered to allow even the most basic career considerations.

Reports from the field indicate that the aviator on ground duty rapidly becomes the most widely experienced and capable officer available and is in demand at every echelon. However, DA has author-

ized assignment of captains to lieutenant positions since the early 1950s when the overstrength in captain aviators was apparent and a severe shortage of lieutenant aviators existed. The effect on an officer's career and self development by assignment calling for a lesser rank can only be surmised; however, one of the very least is the failure to develop leadership qualities.

How can captain, major, or lieutenant colonel aviators in the future Army Aviation program develop necessary leadership experience if they are always to serve in positions authorizing a grade less than that held? It has been basic in the Army process for years that the best way to develop leadership is to assign greater responsibilities. It appears then that a generation of aviators is being developed who will have neither the training nor experience to take on tasks they may well be expected to perform.

Rapid growth of the program over the past few years has allowed the leadership problem to be adroitly side-stepped by training as aviators senior officers who have already developed necessary leadership qualities. Rapid promotion of aviators along with other officers of the Army under the present system will in the near future stifle this procedure unless even greater excesses of field grade are developed.

Department of the Army recognizes these problems and is developing some solutions. The warrant officer training program has been expanded and training of commissioned officers has been curtailed. Officer training has been restricted to lieutenants. It is not planned to place captains or field grade officers in initial entry flight courses in the future.

Several Department of the Army studies are also in progress. They include: evaluation of positions on TOE/TD as to suitability for officers or warrant officers; the need for ground duty and the amount required for maintenance of branch proficiency; possibility of selective assignment to ground duty based on the best record or those who will profit the most.

The long range picture contains many intangibles; however, to illustrate some of the possibilities an idealistic plan could be based on a concept illustrated graphically in figure 2. This concept really contains three features:

Increased use of warrant officers in the lower grades and liberalized use of higher grade warrant officer positions.

Branch material and career development assignments at each grade level.

Narrower base of lieutenant/captain aviator positions and smaller reduction in numbers of aviator positions at each increase in grade level.

The plan would, of necessity, require revision of the current authorized aviator positions, which require a large base of company officers and progressively and critically decreasing numbers in field grade. It would eliminate to a considerable degree grade imbalance, provide opportunity for maintaining branch qualifications, and assure that the fully qualified commissioned aviator would not be involuntarily forced from the program at some late date in his career.

Additional warrant officer aviators could be used to a significant advantage in many TOE and TD positions where they are not now employed. Flight detachments supporting all major headquarters, such as USAREUR, CONARC, etc., are prime examples of TD positions. TOE of aviation companies supporting corps and army are fertile fields of evaluation of positions. Liberalized use of higher grade levels for warrant officers may assist in reducing attrition of trained personnel.

Branch qualification of the officer aviator has been inherent in the aviator program. Opportunity must be afforded in every grade if this qualification is to be maintained. Encouragement in the form of increased PCS authority and increase in the 12 month limitation on ground duty to 18 months as early as possible is essential for the program to succeed. No responsible commander wants to assign an officer to a command position for just 12 months.

A gradual, rather than critical, reduction in aviators authorized between grade levels will squeeze out the incompetent and undesirable. It would also allow some assurance to be given an officer that once entering the program purely a lack of aviator spaces will not eliminate him from the program.

Ground duty for field grade officers must not be regarded as a liability but as an opportunity. Ability which has been proved in several fields is rarely questioned. Career management specialists advise a variety of assignments. A field grade aviator who can secure an assignment on a staff at the division or higher level should be admired and assisted in every way possible since he will be of more value to himself and the Army after such an experience. The criteria should be to get a job, any real job. An inflated aviation position is readily recognized and performance in such capacity will be evaluated for what it is, "featherbedding."

It is easy to blame the system and rationalize ourselves easier solutions. But in the long run, the man who goes out of his way to get a job that adds to his experience is the man that everyone wants working for him. Don't wait for someone to do something for you—do it for yourself.

UH-1B fires rockets during helilift operation in Republic of Vietnam

If you are a young rotary wing aviator with a tour of Vietnam in your future, chances are that an airmobile company will be your new home. You might become a . . .

Fire Team Leader

Captain Alan R. Todd

STANDING BY for a mission is certainly not the best way to make time pass in Vietnam. You have spent some of this time learning the unit SOP — and for once (perhaps for the first time) you appreciate their value, especially those emergency procedures. You also have learned that here in Vietnam the missions of the armed Hueys are limited only by the imagination and, of course, current policy.

One frequent mission for your fire team of 2 or 3 armed UH-1Bs is protecting one or more unarmed helicopters on resupply, administrative, or medical evacuation missions. You often find yourself assisting on these jobs and you

As a fire team leader you'll protect an unarmed resupply, admin, or med evac mission.

chuckle as you recall attacking a Viet Cong machinegun with a sack of rice, a pig, and two chickens in your helicopter.

The phone rings and the operations officer requests your team report to the flight line 5 minutes ago for escort of a medical evacuation mission. That's normal. On arrival you find the commander of the med evac ship waiting with the operations officer to coordinate the mission. You know that a mutual understanding is mandatory NOW between you and the med evac pilot on how you plan to protect him.

Excessive exposure to enemy ground fire for any reason does not accrue leave, increase longevity, or contribute to anyone's health. You are the expert on protection, so base your suggestions on past experience and information you receive in the briefing. The med evac pilot's experience is valuable also, so be flexible and able to change your plan. The important thing is to have a plan *now,* then be ready to adjust it as the situation develops.

Your crews are waiting for a briefing, and you present it, using the five paragraph order form to make certain you don't miss anything. Situation, mission, execution, administration, command and signal is the way it reads. The subparagraph "enemy situation" always reflects the conclusive statement, "yes." This is one piece of intelligence information that can be entered here consistently at any rate.

Your mission is now on the way. Because your briefing was complete no excessive radio chatter clutters the airways. Your en route formation is dispersed so you won't make a juicy traget for a VC .50 caliber and yet is close enough together to act as a fighting unit should the need arise. Experience dictates that 2,000 feet above the ground is not too high for an en route altitude, and you act accordingly. For disbelievers you have memorized some of the maximum effective ranges of U. S. Army small arms weapons—because that's exactly what the VC

Mutual understanding is necessary between fire team leader and med evac pilot

Enemy action can be expected, so be prepared for anything

are capturing every day to use against you.

As the flight passes Mo Cay, you locate the pickup area from coordinates on the 1:100,000 scale map. Yellow smoke billows from the area as the ground troops identify themselves and their location. Everything matches, but it wouldn't hurt to take a real close look at those troops on the recon. The VC have been known to set traps, and this always poses a problem when there is no radio communication with the landing zone.

For the past month every flight into this area has drawn ground fire, and there's no reason why today would be an exception. You hope the classes that Doc taught on first aid soaked in thoroughly, as there is always the chance of one of your team members being hit.

You issue a few short orders and the team begins its recon while the evac ship waits at a safe altitude. As you lead the team into the area, checking approach and takeoff paths, your wingman is intent on covering your every move. Once through the area and it looks O.K., but you take one more look at that treeline to the east before calling in the med evac.

Every flight into the objective in the past month has been hit by enemy fire

Suddenly the popping of the rotor blade is punctuated by a series of familiar "clicks" as automatic weapons fire comes from the treeline. Your crewchief is alert; he marks the area with a smoke grenade and returns the fire while you verify to your wingman the fire and probable location. His position is perfect, and instantly his four machineguns send tracers into the area, suppressing the fire.

Contact has been made and you maneuver your team into position for a firing pass, utilizing the maximum effective range of your weapons. You make your break well out from the target, allowing your wingman ample time on target without flying in too close or over it. As he makes his break he reports no fire, and you recon the area once more.

"The area looks O.K. now," you tell the med evac pilot. "Begin your approach, but avoid the area that we hit." During his approach, your team covers him; and while he waits defenselessly to load the wounded, you don't envy him one bit. After a one minute eternity, the loading is finished and he is coming out. You form the team again, protecting the evac Huey on its climb.

Finally that semi-safe altitude is reached and everyone relaxes a little, but it's not quite "Camel time" yet. A load of unfriendly bullets were fired at your team and there's always the chance of an emergency landing due to a hit. A mental review of downed aircraft procedures is timely along with some thought on a course of action should an emergency occur. You're not a pessimist, you just know that being mentally prepared will always result in calmer and more efficient actions.

Capt Todd is with the 2d Armored Division, Fort Hood, Texas.

Fire Team Leader

Smoke used to screen LZ during airmobile operation against VC

WASHINGTON (AP) — Gen. Harold K. Johnson has won quick approval of his plan to put more U. S. helicopter companies in South Vietnam so troops can move swiftly to counter any attacks on key bases.

Other recommendations made by Johnson, the Army chief of staff, on his return from a week-long survey mission in South Vietnam, are expected to be acted on quickly. These generally involved various ways to increase the effectiveness of counterguerrilla operations inside the embattled country.

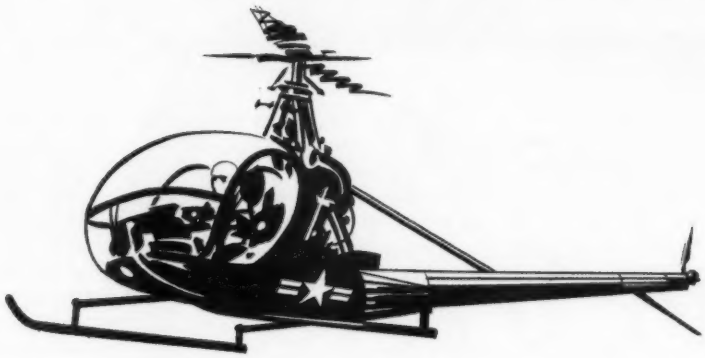
Approval of Johnson's recommendation to beef up the helicopter force came only a day after he reported to President Johnson and Secretary of Defense Robert S. McNamara on what he found in Vietnam.

The general said more helicopters are needed, especially to airlift troops swiftly in case of attacks in the area around the vital Danang air and naval base on the coast of the South China Sea.

The return is uneventful. You can chalk up another successful mission. It wasn't a big mission, but it doesn't have to be a big one for lives to be lost. Good old common sense planning with attention to detail is the job of the fire team leader.

End of a successful mission . . . the result of attention to details

William H. Smith



Lieutenant Leber Highjacked

LIEUTENANT Leber sipped his coffee as he read the morning paper. There was trouble in Vietnam again. The holiday weekend had produced a bumper crop of deaths on the highways. Another convict had escaped from the nearby state prison. This one had killed a guard and was said to be armed and dangerous. Local police and state troopers were making an all-out effort to recapture him.

"Oh, well," Lieutenant Leber thought, "I can't solve these problems. I've got plenty of my own. Better get going."

It was still dark outside but he had to be in the field with his OH-23D by daybreak. The troops left the day before for a one-day field exercise which would start this morning at 0600. Lieutenant Leber had stayed behind to pick up some maps which he now had in his map case.

Checking with operations, he found that the weather was going to cooperate. It would be a fine day in the field. He picked up his equipment and walked toward the helicopter. No use looking for a ride at this time of morning.

To save steps, he took a shortcut between two hangars, which was little more than a narrow alley. Although it was quite dark, Lieutenant Leber had been through the alley so many times that he thought nothing of it.

Halfway through the alley was a recessed door to one of the hangars. As Lieutenant Leber passed the door, he heard a slight shuffling noise. Before he could turn around a cold, hard object that felt like a gun was pushed against his back.

"Don't make a sound, soldier boy," a low, rough voice said. "Where you going?"

For a horrible instant, Lieutenant Leber stood stiff. Then with a sense of forewarning, he asked, "You the convict?"

"I'm asking the questions, you're answering. I killed a man yesterday and I'd just as soon shoot you. Now, where you going?"

"Out on the airfield."

The gun was pushed in Leber's back a little harder.

"I know that, smart boy. Where you going after you get in that airplane?"

"....We're going up ... and you're going to take me just where I say."

"I'm not getting in an airplane."

"With that helmet and kneepad you're not going someplace? Better cooperate, soldier."

"I said I wasn't getting in an airplane. I'm getting in a helicopter."

"A helicopter! What kind?"

"23D."

"A two-seater. That's fine. That's mighty fine. There'll be just you and me, all cozy like. Now listen, sonny boy, we're going up in that helicopter and you're going to take me just where I say."

"This is ridiculous. Why don't you go away while you're still ahead. I'll keep quiet until you're gone."

The convict shifted the gun to another spot in Leber's back. "Get moving, Mac."

The two walked out on the field. Directly in front of them was the helicopter, gassed and ready to go. No one was around.

"Look, fellow," Lieutenant Leber said, "you can't get away with this. When we're in the air you'll be at my mercy."

"Don't depend on it; I know my way around helicopters. For two lousy years I worked for a Louisiana oil company and did lots of flying in them. Try something funny and you'll be dead before we hit the ground."

There was a pause and the convict said, "If we crash we both die. You've got everything to lose. But me, I lose nothing—sooner or later they'll catch me and I'll fry."

When they got to the helicopter, Lieutenant Leber put his equipment in his side of the cockpit. His unwanted passenger stayed close behind, the gun ready to fire.

The lieutenant turned around and said, "Now we've got to preflight."

"No you don't. Just get in. I'll take my chances."

Inside the helicopter, Lieutenant Leber asked if it was all right to warm up the engine.

"Just a little but be ready to fly when I say. If someone should come, take off."

Lieutenant Leber started to reach for the radio but the convict knocked his hand away.

"No radio."

As the engine warmed, Leber started moving the cyclic stick as if it were causing trouble.

"See, I told you we should have done a preflight."

"What's the matter?"

"No free control movement. I've got no rearward play in the cyclic, and I'll never be able to control the helicopter."

The convict tried the cyclic stick and cursed.

"Let's get another helicopter."

"Can't. All the others went out with the troops yesterday."

With that the convict cursed again, jumped out of the 23 and dashed across the field, disappearing in the dark.

Lieutenant Leber watched for a few seconds. Then he called the tower and told them what happened. After a delayed preflight he took off for his assigned mission of the day.

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Late that night he brought the helicopter back to its parking spot. Very tired and hungry he reported to operations then started to his car. As he threw his map case on the back seat, a car drove up and a man got out.

"Lieutenant Leber?" the man asked.

At the mention of his name, Leber swung around, half expecting to see his convict again. Instead it was a state trooper.

"Yes, I'm Leber."

"Saw the helicopter come in and thought it might be you. Just wanted to tell you we captured the escaped convict. The chief wants to thank you and asks you to come to headquarters to give us a statement."

"O.K. When?"

"Tomorrow will do. You look tired now."

"Yes. I've been out on a field exercise, but I'll be down the first thing in the morning."

"See you then. And thank you again."

The state trooper started back to his car. Then he turned abruptly and called, "Lieutenant."

"Yes."

"For my own information, how did you get away from him?"

"I tricked him. Do you know what the cyclic stick is on a helicopter?"

"Yes. I've been a passenger in the state police helicopter several times."

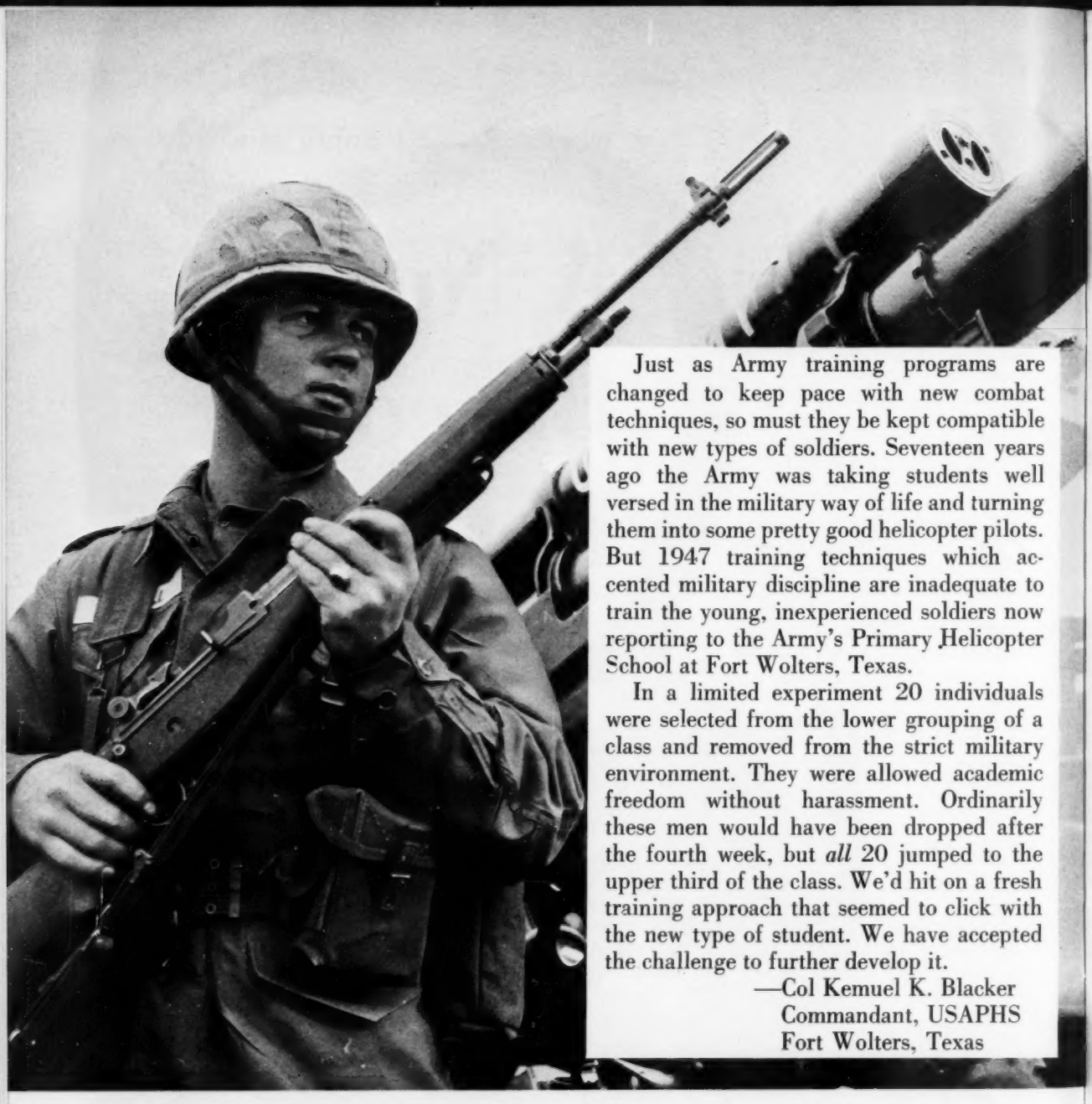
"Well, in the OH-23D the distance between the cyclic stick and the front of the seat is about the same as the width of a map case. The other day I read of a near-accident because a briefcase got jammed between the cyclic stick and the seat. When I put my map case in the helicopter I let it drop in between the stick and the seat. This kept the cyclic from moving rearward. Your convict knew just enough about helicopters to know that the cyclic stick had to move rearward as well as forward. When it wouldn't move, he asumed it was a malfunction and took off."

"But couldn't he see the map case?"

"It was still dark, remember."

A New Breed of Tigers

Lt Col William A. Bearden



Just as Army training programs are changed to keep pace with new combat techniques, so must they be kept compatible with new types of soldiers. Seventeen years ago the Army was taking students well versed in the military way of life and turning them into some pretty good helicopter pilots. But 1947 training techniques which accented military discipline are inadequate to train the young, inexperienced soldiers now reporting to the Army's Primary Helicopter School at Fort Wolters, Texas.

In a limited experiment 20 individuals were selected from the lower grouping of a class and removed from the strict military environment. They were allowed academic freedom without harassment. Ordinarily these men would have been dropped after the fourth week, but *all* 20 jumped to the upper third of the class. We'd hit on a fresh training approach that seemed to click with the new type of student. We have accepted the challenge to further develop it.

—Col Kemuel K. Blacker
Commandant, USAPHS
Fort Wolters, Texas

THE ARMY'S warrant officer candidate flight training program has been getting a new breed of candidates—jaunty young "tigers" with little or no military experience.

These tigers have been running headlong into a training program aimed at *experienced* enlisted men, mostly NCOs. As originally intended this

program worked well, but it backfired with recent enlistees and choked the spirits of our young student aviators.

After a close look at the program, a streamlined approach to training is being tried and is meeting with initial success at the Army's Primary Helicopter School, Fort Wolters, Texas.

The new approach is designed to encourage initiative and desire. It emphasizes the leading, guiding, and teaching of students, and gets them to accept responsibility. The result has been confident young students satisfied with the program for which they volunteered.

Although the number of students trained under the new approach is still too small to be statistically significant, one definite result is a reduced attrition rate, *with no reduction in quality of the students.* We at Fort Wolters feel that our new approach has provided very definite trends on which to base further program developments.

* * *

Nine years ago the warrant officer indoctrination training and **preflight** program was set up to accomplish two goals:

- provide enlisted men knowledge needed for their transition to officer status,
- provide enlisted men knowledge needed to qualify as technician-warrant officer Army Aviators.

The program worked well until about two years ago when we began experiencing the gradual, but marked, influx of inexperienced soldiers. Recently the input accelerated to a point where this included 60-70 percent of the candidates.

The new breed is made up of both high school graduates and young inexperienced soldiers. The high school graduates usually are just under 20 years old. They have enlisted for the warrant officer candidate program and are called to duty, given basic training, and sent directly to Fort Wolters. A close look at these young men reveals a lack of background military experience, a high overall education and intelligence level as measured by AGT scores, and either a desire to fulfill their military obligation or enter into a military career in war-

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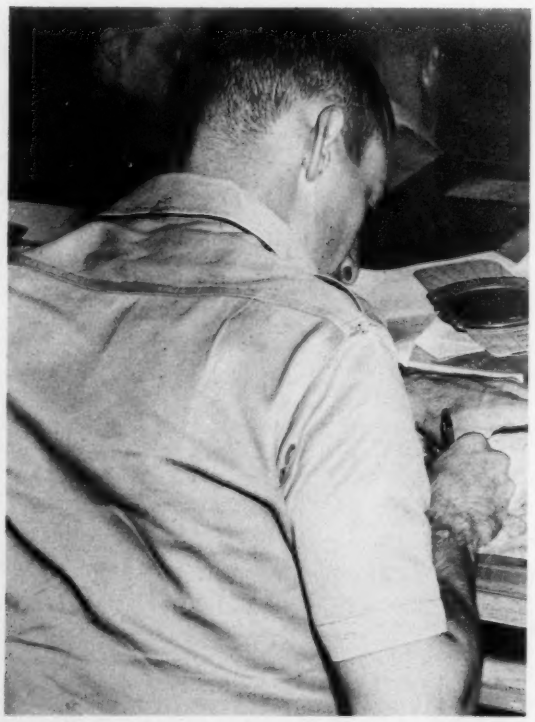
Col Bearden is Director of Instruction, U. S. Army Primary Helicopter School, Ft Wolters, Texas.

A New Breed of Tigers

rant officer status. We have found the young inexperienced soldier is in much the same boat.

The combination of the original program and this new breed mixed like oil and water. A tremendous amount of confusion in these young men resulted, which spawned a resentfulness toward the military as a whole.

A study of the problem revealed that attempts to measure leadership potential for individuals who barely know what the Army is about not only is impossible but is a *questionable goal* in terms of our mission of qualifying individuals to become warrant officer Army Aviators.



Under the old system candidates were seized on their very first day and clamped into such a rigid mold of regimentation that their prime concern became displaying an attitude and appearance of martinet soldiers. This took precedence over the learning process needed to successfully complete the course, and it left little opportunity for development of initiative or independent action.

This was a serious deficiency when one considers that aviators as aircraft commanders must have initiative, responsibility, self-discipline, and the ability to think and plan. A change in the program was obviously needed so we could *develop and measure* these qualities in individuals and eliminate those candidates who fail to measure up. Our streamlined approach—which places responsibility for development on the individual student—provides techniques that are enabling us to develop an improved program.

ENVIRONMENTAL CHANGES

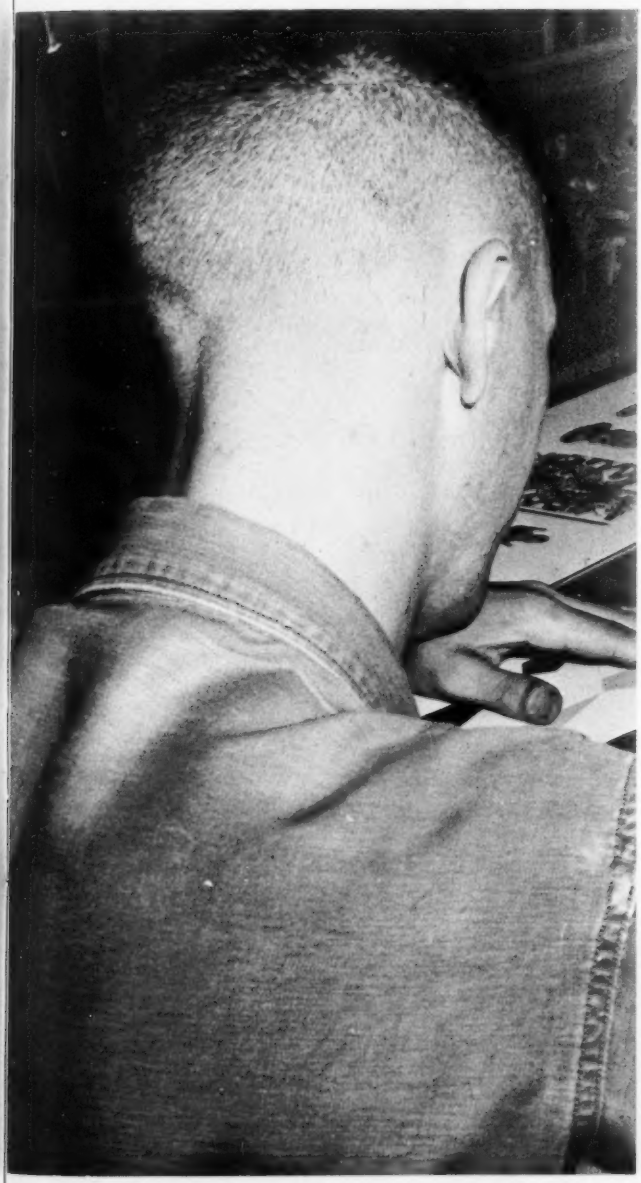
Our tack now is to eliminate strict regimentation and to teach students to accept responsibility and acquire self-discipline. Through our class advisor system (1 officer per 20 candidates) and through counselling sessions, we seek to create an environment in which the individual will develop responsibility and initiative, and acquire maximum knowledge and experience during his stay. Our concern is to measure his spontaneous response in these areas.

We have tried to eliminate negative measurements such as the demerit system. We occasionally throw a few roses at an individual to emphasize the good things he accomplishes. For example, if he makes an approach at a bad angle, he's told about it, but he's also complimented for pegging his airspeed around the pattern. Also, privileges are based on good things accomplished as well as the undesirable acts or situations, which too often were the only accomplishments considered in this area.

We have also eliminated a mandatory study hall which itself was one of the forms of regimentation. Instead we enforce a quiet hour in the barracks area and allow the students to work on things they feel need the most attention—be it study, care of equipment, or relaxing. All the while an advisor is noting each student's action *and* his grade progress. If an individual's grades are poor and he has not properly used his quiet hour, we have ample evidence that his deficiency is one of self-discipline and acceptance of responsibility.

The individual is expected to decide himself which areas require most of his time and attention

A classroom monitored by an advisor available to assist students on problems is kept open during quiet hour for those desiring a more formal study atmosphere. This is part of our effort to give students a chance to be flexible and adaptable. It recognizes that study habits and ability vary among students. One may be able to read his lesson once and know it, but he may have to spend hours on his personal equipment to keep it in proper condition. Each man then is responsible for deciding himself which area requires most of his time and attention.



With little or no military background, the new breed of candidate must be taught the military way of life. The teaching and application (military bearing, saluting, conduct, etc.) is applied to all of the preceding environmental changes discussed. The candidate's progress is observed and measured. What is satisfactory one week will be marginal the next and unsatisfactory the third.

The results of our environmental changes are quite amazing. The combination of our streamlined approach and the few experienced soldiers mixed in each class resulted in unexpectedly high military standards in the first class—even exceeding those of the previous class of the same week level.

In our first class, six students were eliminated after 4 weeks. Five were academically deficient with side reference to deficiency in responsibility and ability to manage themselves and their time. The other was dropped for disciplinary reasons.

The most significant change noted in eliminated candidates was their attitude toward failing the course. Previously those dropped reflected resentment toward the school, Army Aviation, and the military as a whole. Students dropped from the new environment displayed an attitude of having received a fair shake and simple acceptance of failure to measure up.

ACADEMIC CHANGES

Our streamlined approach also involved a review of subject matter and the sequence in which it was presented. During the review of sequence of training we found that candidates encounter a major hurdle at the end of their fourth week. That is when he reports to the flight line, a completely new training environment. Candidates are expected to develop tactical skills amid a swirl of new concepts and terminology (altimeter, base leg, ailerons, etc.). They had not been prepared for this very sudden and decisive change! Many candidates became so discouraged at their inability to absorb so much in the short time allowed that for all practical pur-

poses they had resigned, despite giving the appearance of trying to complete the course.

In considering sequencing, we spread the transition from ground to air over a longer time span in both rotary and fixed wing programs. A blend of military academics and flight training preparatory subjects begins soon after students arrive. Military subjects are covered almost exclusively in the first two weeks, but they are on a 50-50 ratio with flight preparatory training in the third and fourth weeks. Certain aeronautical subjects scheduled in the first two weeks of flight training were switched with military indoctrination subjects that had been scheduled in preflight training. (Some schedule modification was necessary for fixed wing students who spent only four weeks at Wolters and reported to Fort Rucker for flight training.)

SUBJECT MATTER

Time devoted to drill and command and physical training has been reduced from 55 to 22 hours. Previously candidates were required to teach each other these subjects and were measured on their ability to do so. We feel that for our purposes this was not a valid measurement. We have saved a great many hours by *teaching* these subjects. Emphasis is placed on military bearing, precision drill, games of skill, and coordination exercises as opposed to strength building exercises.

Formal inspections have been reduced from 15 to 9 hours because we now concentrate on teaching a man how to *prepare* for inspection rather than how to inspect.

Leadership has been reclassified *leadership training*, with emphasis on responsibilities and principles of leadership.

We have created a new and probably unfamiliar subject called *aerocation* (derived from the words *aeronautical* and *education*). It is designed specifi-

Coordination exercises are emphasized in new program

Inspections have been cut from 15 to 9 hours

A New Breed of Tigers

cally to help the student transition from ground to air.

About 7 hours of aerocation are taught in short periods interspersed in the first four weeks. Subjects covered are diverse, ranging from an orientation at the heliport through an analysis of aviation as a career, discussions with the flight surgeon on fear and apprehension, and demonstrations of maneuvers they will be required to learn.

The revised sequence and subject material is aimed at giving the students sufficient knowledge and understanding so that when they arrive at the flight line instructors can get right to the business at hand—*teaching to fly*.

The first two classes to train under the new approach showed an improvement in academic grade average. In fact, the median grade in mapreading soared from 71 to 84. We attribute this change to two things:

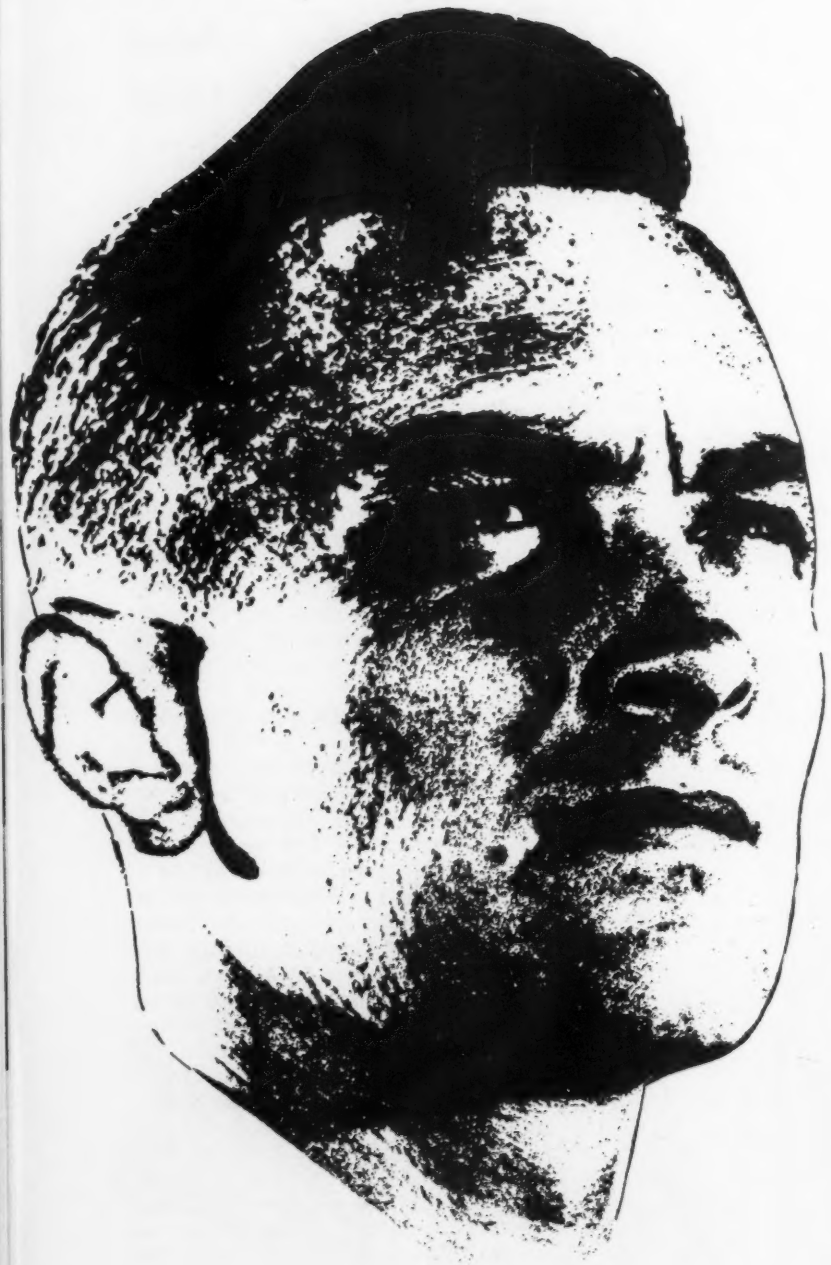
- The revised drill and PT schedule allows more study time.
- Reduced regimentation allows the candidate to do his best accomplishing the goal he set for himself when he volunteered for the program.

Our first group under the new program has moved into the flight program and maintained its improved grade average. The flight instructors enthusiastically reported the students were better prepared to receive and absorb flight training. The average student soloed in about 12 hours—2 hours less than the previous class average. Since the instructors were not required to devote valuable time to teaching cockpit, radio, and traffic pattern procedures now covered in preflight, the students' skill development in the first 5 hours was much higher.

So far the young candidate has responded very well to our streamlined approach. There has been *no* reduction in quality. There has been a distinct improvement in academic development. We have a program that shows merit, but it is not—in our opinion—the final step to the ultimate goal. The results merely show a greater challenge to seek means of producing a better aviator at less cost.

Specialist-4 Calvin W. Krefft, Jr.

Hail to t



CREWCHIEF, that is. He's the man with the wrench in his hand, grease on his nose and a "what's wrong and lemme fixit" look on his face.

You'll find crewchiefs with 15 years of Army Aviation and just plain aviation experience. You'll find school-fresh, pimply-faced teenagers working on your aircraft. Both bear the title "crewchief." They all do the same job, no matter the physique.

Some are slow, some are grumpy, and some are cheery as all get-out. You'd think some had been promoted to captain by the way they smile and greet you as you prepare for a flight in their aircraft. Odds are fantastic, though, against the possibility of a crewchief being commissioned on the spot. Look a little deeper and you'll probably find that the maintenance officer, the CO, or the last pilot to fly his ship complimented him on the ship or on his performance in it. It's funny, as is all human nature to some extent, that something as simple to say as, "Smooth flying ship you've got here, Jones," or "Fine job on those maps, Derrick," will make him feel that whatever he has done has been noticed. It will make the rest of your flight

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Sp-4 Krefft is assigned to Troop D, 3d Sqdn, 7th Cav, APO, N. Y. 09036.

o the Chief

more pleasant—and the next pilot will benefit, too.

Crewchiefs are a strange breed. They can spot a phony compliment on downwind, and they'll take it like ops will a 1080 from Fort Sill to Fort Ord. It won't go. If the crewchief is complimented on something he believes is good, he'll appreciate it and everyone will be better off for it. A compliment on mapreading will bring about a startling grab for the maps the next time he flies, in an effort to show you he can do even better this time. A compliment on the cleanliness of the aircraft will bring about a wash-job the next day if he can round up the time.

If a crewchief is treated like an errand boy, he'll act like one. When he's called, he'll jump, all right—not before.

He can be a helpful fly-buddy with maps, radio frequencies, and other little things around the cockpit which would take an extra bit of attention from the controls.

Let's imagine you're on a tactical mission and you're supposed to report enemy activity in the area of Hill Charlie. If you've briefed the crewchief and, if he doesn't have maps, tell him when you're there. He won't sound so stupid to you when he tells you, "There's a tank in those trees," and you're still 2 miles from Charlie. He saw you looking down and he's trying to help you look for . . . what? Tell him what you're looking for and where, and he'll be an extra pair of eyes.

If it's to be a troop lift, he can look out to the sides while you're concentrating on the terrain you're zooming over. He'll try to help if you tell him what he can help with.

The crewchief is a delicate, precision machine, yet a sensitive human being. He'll work late and hard if he's shown in some way, no matter how small, that the work he's doing is being appreciated. He doesn't expect you to bruise your palm slapping him on the back or to run up to him, throw your hand out in greeting and say, "Hiya, Joe-babes. How's it goin'?"

The ship he crews is his baby and he takes pride in it. If you see something you think is worthy of complimenting, by all means, mention it. He'll work out like a UH-1 for you.

Hail to *your* crewchief? Why, HAIL yes.

A compliment on something a crewchief believes is good will have endless benefits

The Sport For You

Army Aviators perform best when they develop and maintain a high level of physical conditioning

MAN IS BECOMING healthier and stronger. Proof of this can be seen in the record books of the sports world as old records fall and new ones are entered with increasing frequency. Every year it's higher and higher, faster and faster, and farther and farther."

These were the words of a colleague of mine, a former sports writer who often refers to the field of sports when illustrating a point. I find it difficult to argue with him on this point. However, the question often asked is, "Why is this so?"

The reason for this apparent improvement in man's general health and ability has many factors. One of the most significant is the remarkable progress made by medical science, resulting in a healthier man in a healthier environment.

The athletic records that are being broken every year are the result of a program of intensive study, research, and development in the recently expanded specialty field of athletic or physical medicine. This information is applied to the development of new training techniques, refinement of old training methods, and improved examination and treatment procedures for those engaged in sports, and has resulted in advancements previously thought impossible. This observed improvement in performance is not so much the development of a superman or super athlete, but in reality is the result of a better understanding of man himself, his capabilities and limitations. He is able to use more effectively and efficiently those factors which he has always possessed.

At this point, one might say, "This is all very interesting, but how does it apply to us, the aviator and the aviation environment?" The answer is as simple as the unquestionable statement that man performs best when he develops and maintains a high level of physical conditioning. Attempts to produce the desired level of physical conditioning in large groups of individuals by using the calisthenic physical training program approach has been to a great extent unsuccessful. The desired result can be achieved equally well and much more acceptably through a program of organized participant sports.

In contributing to the development of the improved athlete, medical science has capitalized upon the fact that specific types of training will develop specific systems and functions in the human body with improved reflex-reaction time, endurance, and strength. All of these factors are important to the aviator and other aviation personnel in producing and maintaining accuracy in function and sustained performance.

As specific examples, sports such as tennis, baseball, and handball are primarily associated with the development of improved reflexes and reaction time. Swimming, basketball, and track and field participation will primarily improve endurance. Weight-lifting and wrestling will improve specific muscle tone with resultant increase in strength. Almost any sport, if performed properly, will develop all three of these desired characteristics to varying degrees. Concentration upon one type of sport should be discouraged. A well-balanced, selective program designed to develop and maintain reaction time, endurance, and strength resulting in high levels of sustained performance is desired. Such a program should and can be developed on the basis of the particular needs of the individual required to perform his specific tasks.

The need for those working in the aviation environment to maintain high levels of physical fitness is equal to, if not more important than, the emphasis we place upon maintaining the aircraft we fly. The man is as important as the machine, and in the interests of flying safety both must be maintained at levels necessary to produce safe, sustained performance.

Gossip is the voice of the devil. It has ruined many a person's reputation and career. Operators' acceptance of a new airplane such as the Mohawk can also be hindered by unwarranted and uninformed gossip.

Speaking of the OV-1

Gerald T. Thorpe

SOMETIMES, after several unfortunate accidents, a new airplane has gained a reputation of being vicious and unpredictable—a widow maker—by pilot gossip. For some, the Army's OV-1 Mohawk has had a reputation of this type. This stigma has resulted from several misconceptions. Generally, I have found after flying some of these airplanes that accusations of this type were unwarranted. In reality, they were easy to fly, forgiving birds. For this reason a review of the Chief's characteristics follows.

The first two years the OV-1 was in the inventory, its accident rate was the highest in Army Aviation. The fatality rate was also very high. This created concern among aviators flying the Mohawk and a lot of aviators became reluctant to check out in the bird. This is a natural reaction. But in taking a closer look at the accidents my own conclusions are that the largest percentage were caused by lack of knowledge in aerodynamics, low pilot proficiency, and in some cases by downright foolishness. Let's briefly review two of the accidents that seem to point to a lack of knowledge in aerodynamics.

One accident was the result of a very steep turn low to the

Mr. Thorpe is a civilian flight instructor, Standardization Flight Division, Dept of Fixed Wing Tng, USAAVNS, Ft Rucker, Ala.

Photo courtesy Ryan Aeronautical Company

ground during a gunnery run. The turn was so tight that a high-speed stall was produced and the aircraft rolled into the ground. Another was a steep dive and abrupt pullout from low altitude. The combination of dive angle and speed did not permit recovery in the altitude available. On the foolhardy side is aerobatics at low level. The only thing to say about this is: if you are not above average in precision aerobatics you may have to pay the fiddler if you dance.

Let's review some basic aerodynamics. Until the birth of the Mohawk, most Army Aviators were experienced only in airplanes of light wing loading. The highest g-load most had experienced was not over 2 g's. Aviators flying the

OV-1 need to understand what high wing loading and high load factors do to the flight characteristics of an airplane.

The OV-1 at 14,000 pounds has a wing loading of approximately 42 pounds per square foot. The U-6A at 5,000 pounds has a wing loading of about 20 pounds per square foot. This difference in wing loading can make a big difference in performance, particularly the load factor. At this load, the Mohawk in some normal missions calls for a dive recovery of 4 g's, whereas the Beaver would only be exposed to less than 2 g's in any normal mission. The U-8 and U-9 under heavy load can come close to the OV-1 in wing loading but these airplanes are normally operated at much less than 2 g's and are very seldom exposed to landing in short or unimproved fields.

In the OV-1, high sink rates can develop long before the actual stall occurs. To stop this sink, it takes far greater altitude loss than ever experienced in the O-1 or U-6A. If the airspeed is allowed to get slow or abrupt use of the elevator is made, the Mohawk will head for the deck at a heart-in-the-mouth rate. Once this characteristic is understood, the aviator should have no difficulty staying out of this condition.

I have felt for a long time that an airspeed indicator does little to tell the pilot of an impending loss of control. An angle of attack indicator would give the aviator continuous information on what is taking place with his wing. The pilot would be able to safely fly the airplane at optimum angle of attack. Until this instrument is made available, airspeed and the pilot's feel and sight are the only indications of approaching loss of control. Most of us add a little for a buffer zone. Those who don't usually, sooner or later, "buy the farm."

The 1 g stalling speed, power off, is most generally the one given in airplane handbooks. If you ask any aviator at what speed a particular airplane will stall, this is the speed he most likely will give. The airplane will seldom stall at this indicated airspeed, for it does not take into consideration load, weather, instrument error, power or control touch.

Any airplane within the limits of its structure may be stalled at any speed. When a sufficiently high angle of attack is imposed, the smooth flow of air over the wing breaks up and tears away, thus producing a stall. Generally this causes a rolling action when the angle of attack is increased rapidly and the stall occurs at a speed higher than the 1 g stalling speed. A study of this effect has revealed that the stalling speed increases in proportion with the square root of the load factor. This means if the stalling speed at 1 g is 100 knots, at 4 g's it will be 200 knots.

In attempting a level altitude turn, 4 g's will be produced at a bank of slightly over 75° and at approximately 85° bank 9 g's will be produced. A thorough appreciation of load factors induced by varying degrees of bank and rapid pullups will do much to aid in preventing accidents in steep turns and dive recoveries low to the ground.

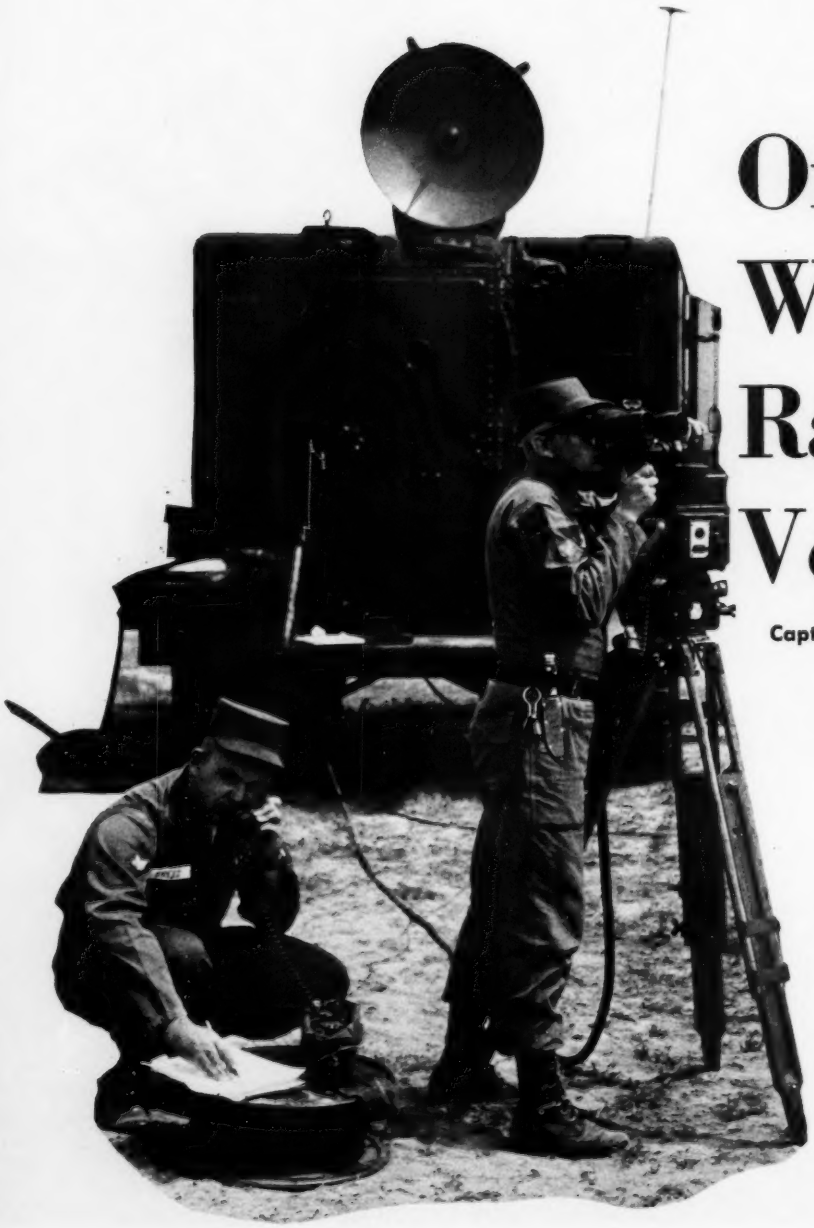
Accidents are costly in both money and heartache. Human error seems always to be considered the highest factor in accidents. Many times this human error is in the cockpit. We all make mistakes, but let's try to avoid the fatal ones. Let us look at the cold hard facts and learn something that will help us to avoid accidents.

So, let's stop the bad talk about the Mohawk. The Chief's a dependable, easy to fly airplane—one that gives all sorts of warning before entering an uncontrolled flight condition.

If you don't learn to appreciate what load factors and wing loading can do, then, son, don't go near the Indians.

The Chief is a dependable easy to fly airplane that gives pilot ample warning before entering unsafe flight regime

Here's another example of how Army Aviation units (in this case, ASTAP) provided additional support through initiative and imagination



On Target With Radar Vectors

Captain John S. Jacob

WHILE EXTENSIVE research and development is being conducted to provide a universal position-fixing navigation system, we have a navigation aid within the present aviation battalion. Using vectors from radar set AN/MPQ-29, normally used

Assigned to the Dept of Fixed Wing Tng, USAAVNS, Ft Rucker, when he wrote his article, Capt Jacob is en route to Germany.

Meeting special requirement for unusual mission requests can be done using drone tracking AN/MPQ-29 radar sets

to track and plot the course of either a drone or manned aircraft, aerial resupply aircraft can be directed over their drop points under marginal or instrument weather conditions, ensuring delivery of needed supplies under otherwise impossible conditions.

This set can also be used to help unit aircraft locate a new base field during night movements and to augment the GCA unit for a surveillance approach backup. The following examples indicate some additional capabilities of this aid.

A request to illuminate a battle group objective during a night attack has been received by the operations officer. A weather check indicates there will be a high overcast with no moonlight available to aid the pilot in locating the area. Previous aerial surveillance reports indicate that the enemy's light discipline is excellent, so there will be no ground reference lights to pinpoint the drop site for the flares. Time and distance from base airfield could be used, but the illumination is to be on call. Premature illumination or illumination of the wrong area could jeopardize the infantry mission with possible disastrous results. Can this request be accepted and

the mission performed satisfactorily or will it have to be turned down?

This request was accepted by the 7th Aviation Company, 7th Infantry Division, during a battle group ATT in Korea. Flares were dropped on target on call, and the infantry objective seized as planned. The mission was flown by a U-6A airplane using radar vectors from the AN/MPQ-29 radar set organic to the Aerial Surveillance and Target Acquisition Platoon (ASTAP).

The AN/MPQ-29 is authorized as a navigational aid for manned surveillance aircraft and the MQM-57A drone system. **Two AN/MPQ-29 radar sets are authorized in the infantry, mechanized and armored divisions (TOE 1-78E), and one AN/MPQ-29 is authorized in the airborne division (TOE 1-58E).**

This set is a mobile tracking and plotting radar system mounted on an M-200A1 trailer. The PV-264/U power unit is mounted on an M-105 trailer, and is then designated PU-269/U Power Unit. Both units require a 2½-ton prime mover.

The system is used to track and plot the course of either a drone or manned aircraft. Minimum range of the system is 300 meters; maximum range using "skin tracking" is approximately 17 kilometers, while "beacon tracking" increases the maximum reliability range to approximately 40 km. The maximum rated range for search and automatic tracking is 92 km.

In this mission, as in all others using radar, the desired course of the aircraft was plotted on a standard scale map before the flight and the map inserted on the plotting and tracking board in the radar van. As the mission was flown the flight path was automatically traced by a stylus on overlay paper, providing a record of the flight for future reference. By directing the aircraft's actual flight path to coincide with the predetermined and desired flight path, the aircraft was assured of being in the correct position at the correct time to accomplish the mission.

While this mission was not typical of the functions of ASTAP, it is an indication of special requirements that can be handled by Army Aviation units. ASTAP's mission is to provide aerial coverage of the area of influence in general support of the division's intelligence requirements.

Functions and equipment used include the OV-1B Mohawk with Side Looking Airborne Radar (SLAR) to acquire moving targets and to provide surveillance of routes, zones or areas where enemy activity is suspected, and the OV-1C with an infrared detector system to provide air-to-ground infrared surveillance of routes and points within enemy territory and to acquire targets. An aerial photographic surveillance system can be mounted on either of the OV-1s as well as in the MQM-57A unmanned surveillance drone. Any of these may be employed on day or night missions.

Photographic surveillance equipment used in the drone or manned surveillance aircraft is extremely versatile. The equipment produces vertical and oblique photographs singularly or with 60 percent forward overlap. When overlapped, these photographs can be matched to form "stereo pairs" or reconnaissance strip maps.

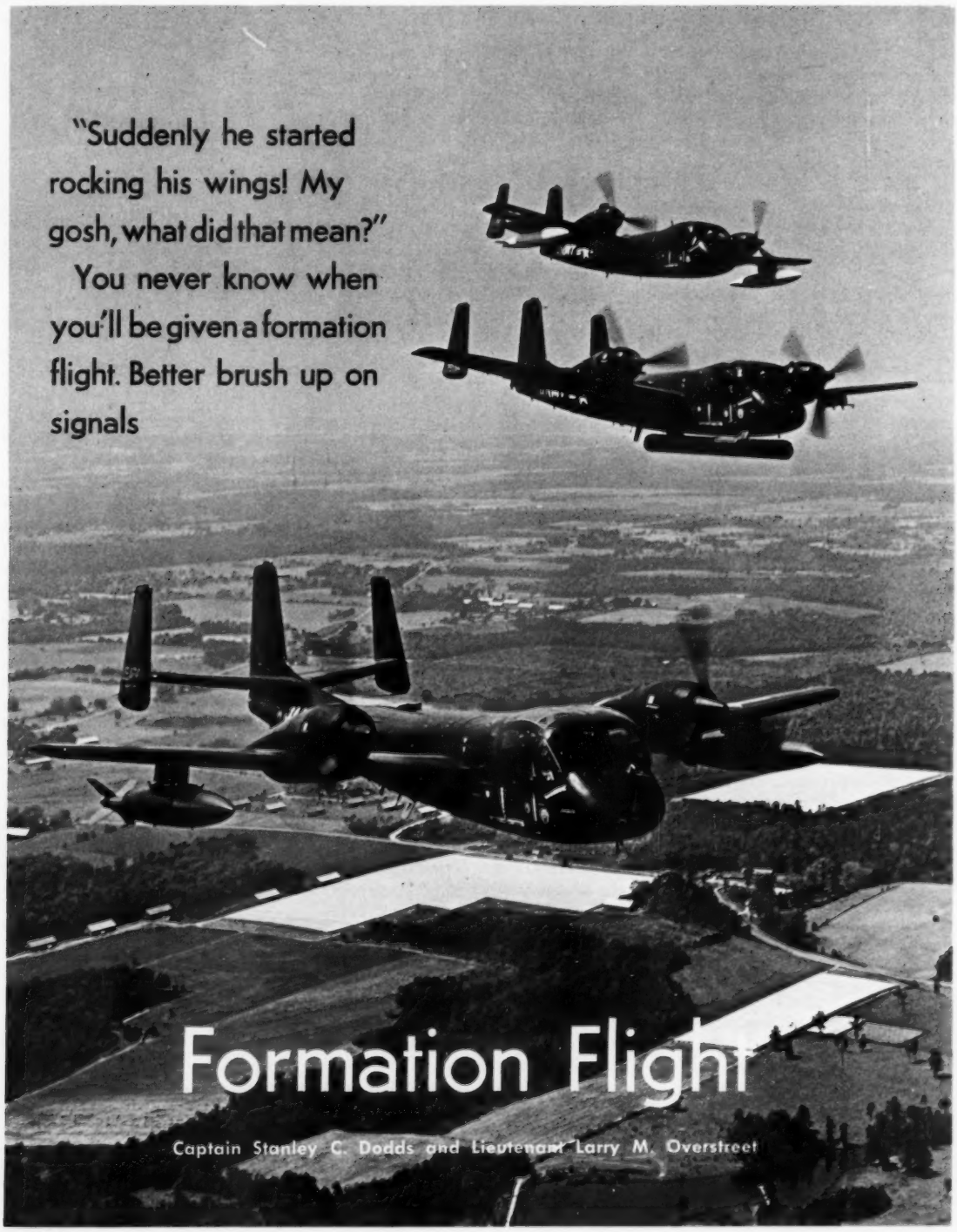
A request to photograph a proposed training area 5 miles wide and 10 miles long (50 square miles!) was accepted by the Aerial Surveillance and Target Acquisition Platoon. Forward overlap for the mosaic could be handled by the photographic system, but what could be done to resolve the problem of horizontal overlap? Ground reference points could be used by the pilot to orient his flight path, but this would not be accurate enough to provide constant overlap.

Once again radar vectors were the solution. The degree of overlap was computed and plotted on the map. A U-6A was used and the only requirement was to direct the aircraft on the desired flight path and indicate when to activate and deactivate the camera. **After completing the first leg the aircraft was vectored to the second leg and so on until the entire area had been photographed and the mission accomplished.**

These two examples were not typical of the missions of the Aerial Surveillance Platoon but were accomplished through initiative and imagination.

The AN/MPQ-29 radar set is designed for some mobility and can go anywhere the 2½-ton prime mover can go. Since it is normally located well forward, it is readily available for other missions when not being used to guide surveillance aircraft missions. Security from enemy ground attack and enemy detection of radar use present the biggest limitations. Coordination with the unit in whose area the radar is set up will provide local security. Restricting use of the radar to essential missions and frequent movement will negate the enemy's detection of the radar. Once moved the radar can be set up and back in operation in fairly short order.

Certainly other mission areas can be improved by using radar vectors and tactical radar sets already in use by the field soldier. The MPQ-29 has its limitations, but it can be a tool in development of that age-old Army temporary problem solver—the field expedient. All it takes is "imaginuity."


"Suddenly he started rocking his wings! My gosh, what did that mean?"
You never know when you'll be given a formation flight. Better brush up on signals

Formation Flight

Captain Stanley C. Dodds and Lieutenant Larry M. Overstreet

THE LEADER MADE another porpoising movement with his airplane. It was hard to believe that he wanted us to close in even tighter. I eased in a little left rudder, added a slight amount of power and slipped in a little closer to Phil, the flight leader. I could see him moving around in his cockpit trying to see us off his right wing, but I doubted that he could see us at all in our position in a stepped up right echelon. I knew he wanted it to look good for this demonstration but this seemed too close.

I had never flown this close to another aircraft, even practicing formation at higher altitudes. But here we were buzzing around the countryside at less than 500 feet absolute and less than 10 feet apart. The air was slightly turbulent at this altitude and I knew the number three man was having difficulty holding in tight, so I was trying to hold my position as steady as possible to make it easier on him. It was still about 5 minutes before the demonstration.

I had been in this unit only 3 months and this was my first assignment out of flight school, also the first demonstration I had been involved in. We had been in the air almost an hour now practicing for this show. I could tell! I had to keep reminding myself to ease up on the control touch now and then. My left foot was almost asleep from having to hold in a slight amount of left rudder. I'd have to remember to write this baby up for trim when I got back. I was also getting a headache from concentrating so hard on Phil's airplane.

Good deal. Phil gave two quick fishtail movements telling us to open up a little wider. I knew he was trying to give us a chance to relax just a bit before the final flyby. I eased back a little and suddenly this normal position seemed great. All kinds of room. I still wished my radio was working, but we had no spare aircraft at the field this morning and Phil said it would be OK to fly without radio as long as I paid attention to his signals.

This was the first time I had ever had to fly formation by visual signals alone. In school we always used the radio. Well, in school it seemed they were more strict on a lot of things. I wished now I'd asked Phil to review the signals. But I knew he expected me to know them, so I would have felt foolish asking him, and things seemed to be going OK so far.

There went the porpoise again. It was nearly time for the demonstration and we were closing in for the big show. Once again I slipped in a little tighter. Boy that prop looked close to Phil's right wing. Suddenly he started rocking his wings! My Gosh, what did that mean? Form a V formation? I couldn't remember. Besides we were to be in a right echelon for this show.

Abruptly Phil turned left and began a climb. I could hardly stay

on him. Why was he going this direction when the demonstration was the other way? He must be trying to check my alertness. He sometimes did things like this I was told. It appeared that he was heading back to the field. I wished my radio was working.

I checked to see if Bob was on my right wing but because of the left bank I couldn't see him. Then I saw him come up underneath on my right and motion for me to break away from Phil. I immediately did so and followed Bob who entered the pattern at the field and landed after Phil.

There I found out what had happened. Just after we had closed up again, Phil suddenly noticed his loadmeter almost pegged on

the high side. Fearing that the battery would blow, he rocked his wings, signifying "break it up." That's what it meant! He couldn't see us but was certain we had broken off, so he took it on the lam for home.

Capt Dodds is a flight commander, Contact Div, Dept of Fixed Wing Tng. Lt Overstreet is a flight instructor with the Dept of Fixed Wing Tng, USAAVNS, Ft Rucker.

Then it occurred to me what might have happened if he had turned right after he gave the signal to break up: he would have turned right into me. It could have been disastrous for both of us.

I decided then and there to study up on formation flying.

Here's what I found:

Interval is the fore and aft distance between aircraft in an element or between elements.

Lateral spacing is the distance from wingtip to wingtip or the side-to-side distance.

Step-up is the vertical distance between aircraft or between elements. The distance should always be enough to allow adequate clearance in all directions.

If the proper lateral spacing, interval, and step-up are maintained the wingmen will be at about a 45° angle to the side and rear of the lead aircraft. This is the proper position for a V formation.

Few visual signals are needed to control a formation in case a radio cannot be used. Visual signals used most often are—

Breakup — a gentle rocking of the wings.

Join up — a series of shallow climbs and dives or porpoising.

Openup — fishtailing the aircraft caused by using alternate left and right rudder.

Left echelon — a slight dipping of the left wing.

Right echelon — a slight dipping of the right wing.

These signals are used at the U. S. Army Aviation School. If made distinctly, they are all that are needed in most cases to control a flight. If echelon flight is needed for any reason this can be accomplished by only one man changing his position in the basic element.

For example, if the leadman dips his right wing, the left wingman or number 2 is the only one to change position. He does this by reducing power slightly then crossing *under* both aircraft by using right rudder. Once under the right wingman and at approximately a 30° angle to his right rear, the left wingman adds power and assumes the correct step-up on the right wingman. The flight is now in an echelon right. The crossover may be accomplished by doubling the step-up and crossing over the other aircraft, but visibility during this maneuver is not as good as when crossing under the other aircraft.

The techniques of the leadman are very important because he is responsible for leading the flight and keeping it clear of dangers and obstacles. All turns must be made slowly and smoothly, preferably using no more than a 20° bank. Climbs and descents should be made at cruise airspeed. All visual signals made by the leadman should be clear and distinct so there will be no question as to their meaning. When flying the lead aircraft, bear in mind that much more room is required to maneuver a formation than just one aircraft.

Although the leadman has the greatest responsibility, the wingman must be mindful of his technique. He must constantly watch the lead aircraft and/or the other wingman and maintain the proper spacing.

To obtain the best results the wingman must be able to anticipate the leader's moves. Both leadman and wingman should bear in mind that the key to good formation flight is good technique mixed plentifully with smoothness and alertness.

CRASH SENSE, UNITED STATES ARMY BOARD FOR AVIATION ACCIDENT RESEARCH

Maintenance Sense

Major Chester Goolrick

MANY A successful business executive in the 90 percent income tax bracket knows deep down he would still be loading cases in the shipping department at 30 bucks a week if he had not been lucky enough to acquire a solicitous wife. She saw to it his socks were always darned, his calorie intake stayed at the proper level, and that he climbed aboard the 8:15 commuter special every morning in tiptop shape to do battle with the business world. He had his job to do, and she had hers, and between them they got to the top and stayed there.

Every successful front line performer owes a considerable debt to the sure, conscientious services of unsung heroes who labor long and hard behind the scenes to make a tricky task seem as smooth as double-whipped cream. If his assistant doesn't know his job, is off wool-gathering, or couldn't care less, Merlin the Magician will finish his act some night by taking a chunk out of the young lady he is pretending to saw in half.

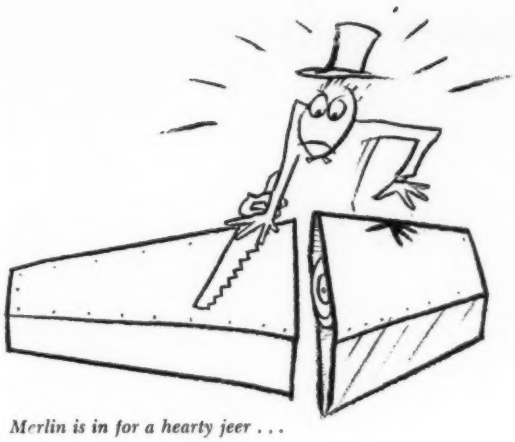
Merlin knows a well-trained professional property man is an absolute necessity. You can bet your boots once he is lucky enough to acquire one he keeps him under lock and key, feeds him on 2-inch sirloins, supervises his work, and sees to it he approaches his task with the spirit Army has when it lines up for the kickoff against Navy.

Merlin is in for a hearty jeer from the audience and a fat lawsuit from his blonde assistant if his saw bites down because his property man was trying to figure out how much he owed the grocer when he should have been giving his full attention to his job. At that Merlin's position is not as critical as those of people whose professions make them *utterly* dependent, not only for their livelihood but for their very lives, on the reliable work of those entrusted with keeping the tools of their trade in proper order.

A HORSE! A HORSE!

In this category, Army Aviation stands out like a full moon at the beach. Pilots are the latest in a long line of military men who can be rendered as helpless and as vulnerable as oysters on the half shell if faulty maintenance turns equipment they are counting on into something as helpful as a sieve in a leaky rowboat. Everybody remembers how King Richard lost his horse, his kingdom, and eventually his head because some lame-brain in the shop forgot to include the right number of nails when entrusted with the task of shoeing the battle steed.

The situation has not basically changed. Some aviators have discovered this after their aircraft have been overcome with sleeping sickness in mid-flight. A missing cotter pin or an improperly torqued bolt can put a man in a position where, given the choice, he might gladly swap places with King Richard and take his chances.



Merlin is in for a hearty jeer . . .

Between them they got to the top

Maintenance Sense

Dependent for their very lives on reliable maintenance work

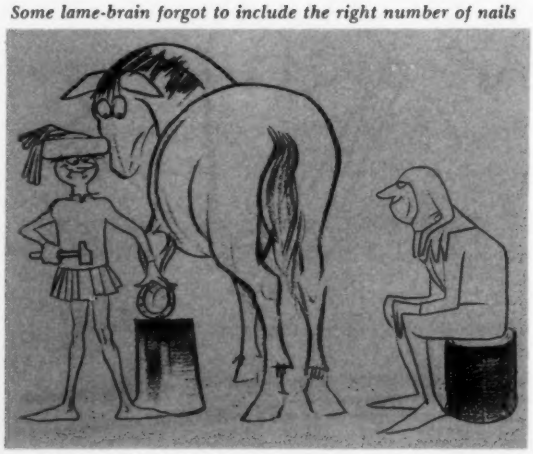
When you boil it down, it comes to this:

AN ARMY PILOT IS NO BETTER THAN THE AIRCRAFT HE IS FLYING. THE AIRCRAFT IS NO BETTER THAN THE MAN WHO SERVICES IT.

Agreed? All in favor say aye? Sure. Everybody knows an improperly serviced aircraft can be just about as lethal as the gas chamber in the big house. All support the view that Army aircraft maintenance standards should be as close to perfection as it is possible for human beings to get. Where the fly gets into this batch of ointment is that the Army *does* have a maintenance problem, and no small one at that.

It may sound as if we are making a lot out of a little when we say only about 7 percent of the Army's aircraft accidents over an extended period have been laid directly to maintenance. Keep in mind the grim fact that a maintenance-caused crash is likely to be one of those affairs nobody likes to clean up after or even think about. Add to this the enlightening thought that at least 15 percent of accidents over a similar period can be ascribed to material failure, which is the same in some cases as saying that somebody has subjected a part to a strain it wasn't built to take. And tack on

Some lame-brain forgot to include the right number of nails



one more item: skillful work on the part of pilots turns many potential maintenance-caused crashes into routine forced landings. You begin to get a picture about as cheerful as an afternoon TV soap opera.

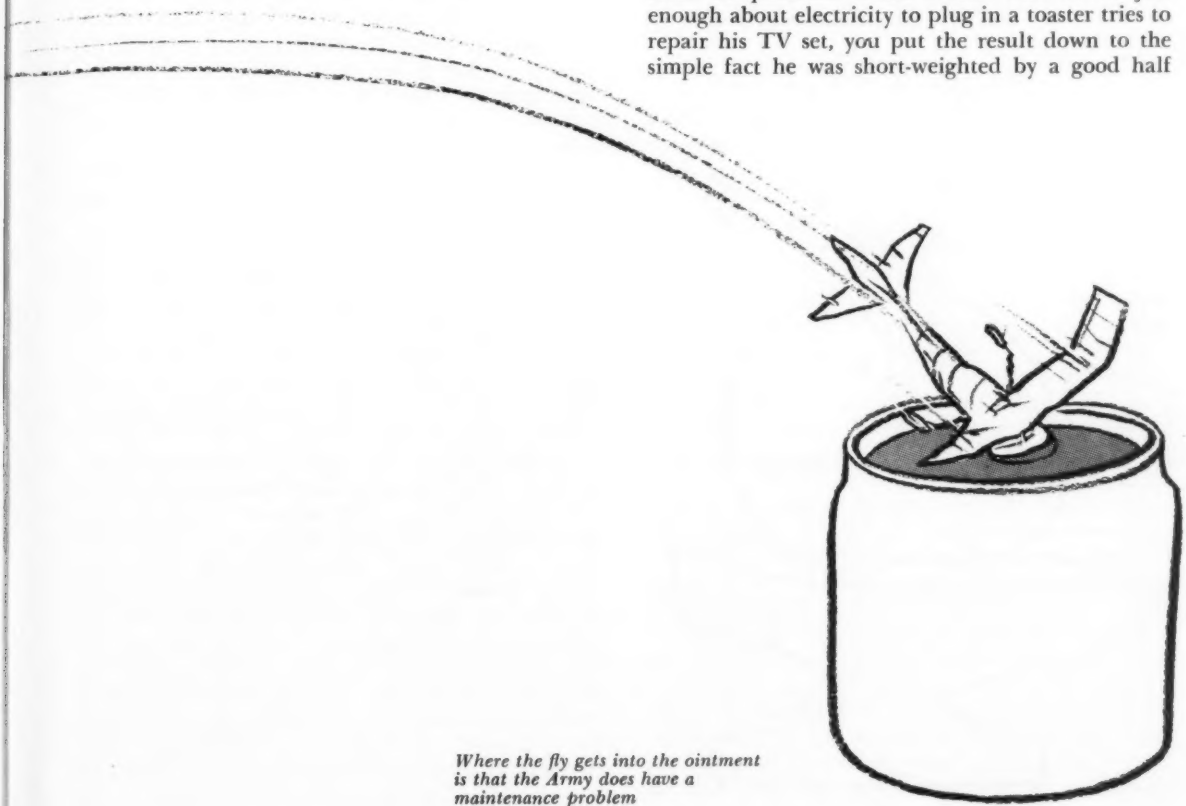
What makes the story even worse is that *every maintenance-caused accident is totally preventable.* To be sure, we are all aware the human factor is present in every aspect of Army flying. There is no arguing that occasional accidents take place because of factors nobody could have foreseen or averted. With maintenance accidents, no. Given a properly working personnel and supervisory system, accidents caused by faulty maintenance should go on the shelf with other hazards of the past, such as yellow fever and runaway brewery wagons.

When a doctor examines a patient he first determines what kind of bug he has and then sets about getting him back on his feet. As a first step, then, in Stamp Out Maintenance Accidents Week, let's

see what is wrong, and
determine what to do about it.

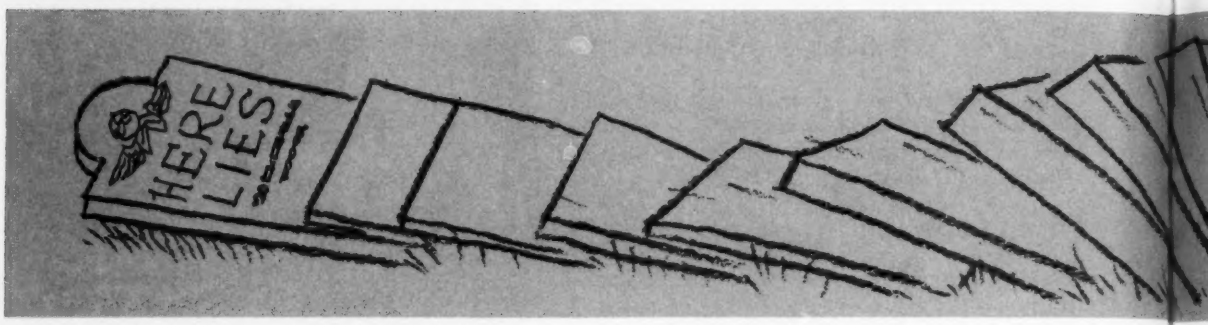
THE FLESH IS WEAK

Human beings, all of whom come equipped with standard, high-fidelity error capacity systems, commit mistakes for a variety of reasons, some trivial, some complicated. When a man who knows just enough about electricity to plug in a toaster tries to repair his TV set, you put the result down to the simple fact he was short-weighted by a good half



Where the fly gets into the ointment is that the Army does have a maintenance problem

Maintenance Sense



pound in the brain department. When an Army mechanic, or any other man *trained* to do an important job that *must* be done right, commits an error, the trouble can be a little harder to diagnose.

In general, we can say maintenance mistakes fall into five broad categories:

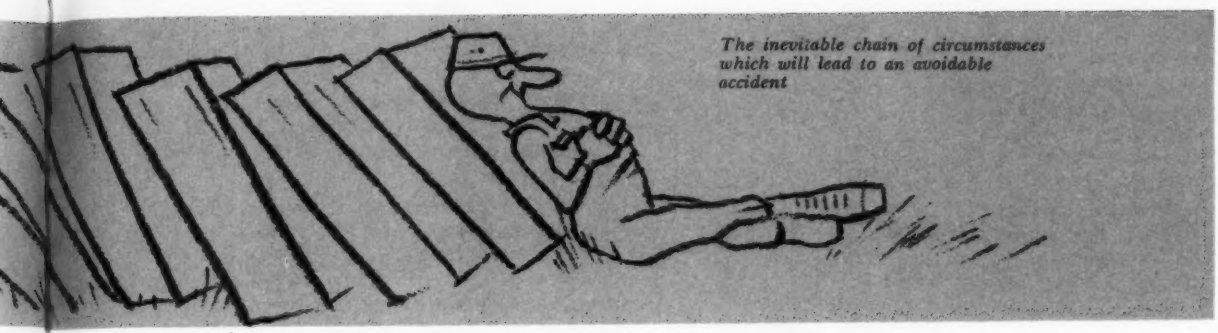
A man holding back a head of steam is in no condition to cope with an important task

Pressure
Lack of experience or training
Faulty attitude
Sloppy procedures
Inadequate supervision

These conditions can affect the performance of *any* mechanic or anybody in Army Aviation connected with maintenance at some point in his career unless he gives solid thought to what his job really means and how he fits into the picture. That particular career point will be the one at which he will do something he shouldn't do, or fail to do something he should do, with the result that he will set in motion the inevitable chain of circumstances which will lead to an avoidable accident.

Pressure, for instance. Here is one condition military men have considered more or less normal since Hannibal took his elephants on a forced, hurry-up march across the Alps. Every military man from the beginning of time has known what it is like to be confronted with something complicated which should have been done a half hour ago. In Army Aviation, maintenance work a good part of the time must be performed by men who are under some kind of pressure, mental or physical—frying under a mid-summer sun, freezing cold, or just plain tired.

Personal physical and mental problems make up pressure which affect one's performance even when everyone else in the unit has had 12 hours of sleep and began the day with a breakfast of steak and eggs. A man with an impacted wisdom tooth who feels as if somebody were using his jaw for an anvil is obviously in no fit condition to cope with an important and complicated task calling for full concentration. Neither is the one holding back a head of steam because his wife has just bought a baby grand piano on the installment plan. And the man with *real* physical or emotional problems can be so drowned in his own woes he shouldn't be trusted with adjusting a pair of roller skates.

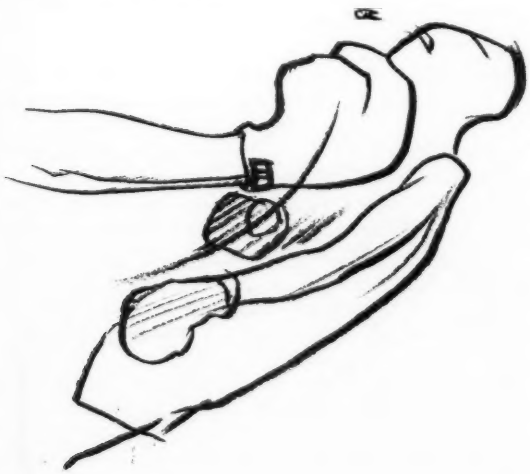


The inevitable chain of circumstances which will lead to an avoidable accident

People in the grip of relentless pressure overlook important details. They give something vital a lick and a promise. They put off until tomorrow the thing which *must* be done today. What they are really doing is sowing some guaranteed, sure-sprout trouble in particularly rich soil. In a recent helicopter crash, which killed all aboard, the crewchief failed to ground the aircraft for necessary repairs. He evidently felt it *could* make it back to base and knew the pilot and his passengers were in a hurry. He was tired. He lost his judgment. He gambled. He lost his life.

On another occasion, a helicopter crash was laid to a missing scissors link in a main rotor head. Because of a visiting VIP, Operations wanted 15 aircraft when five or six was normal. Somebody had to hurry. Somebody goofed.

He dropped the guard his experience had taught him should never be relaxed



What it adds up to is that pressure of any kind can result in the margin of safety being whittled away until it no longer exists. Trying to speed up the job, a good crewchief injured himself badly one day in a still-turning prop because he left no room for worry, preoccupation, or fatigue. Totally concerned with getting the job done as soon as possible so he could move on to something else crying for attention, he dropped the guard which every bit of his experience had taught him should never be relaxed.

A LITTLE LEARNING

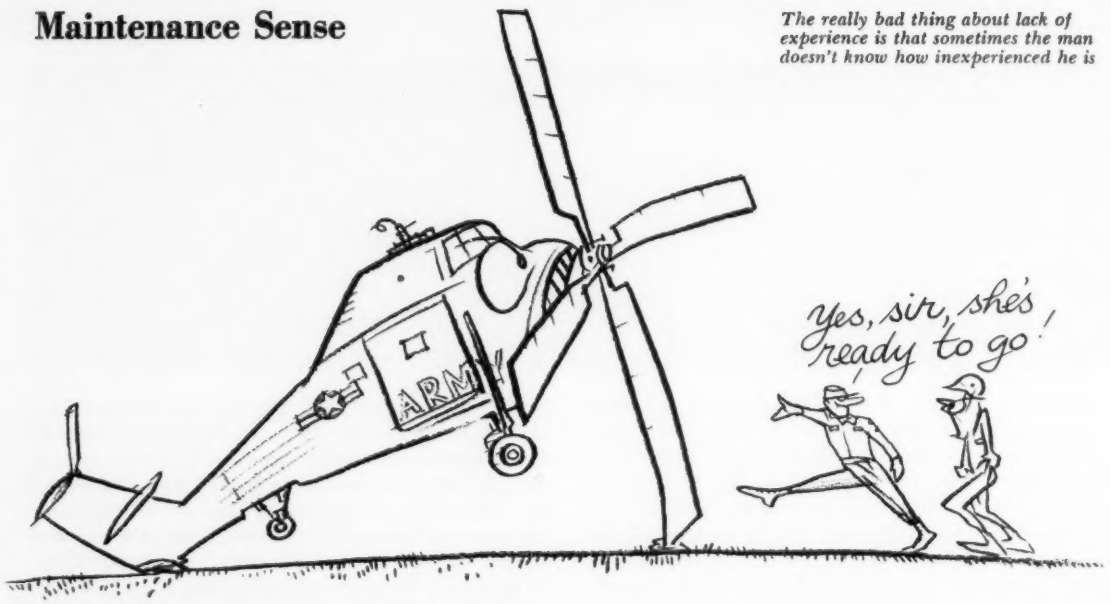
Here was a case in which long experience may have hindered rather than helped; another in which close familiarity with something dangerous caused a man to overlook fangs longer and deadlier than a Texas sidewinder. A good part of the time, however, a simple lack of knowledge or understanding of the job is the factor behind the simple, garden-variety, day-to-day type of maintenance error, which produces enough headaches to keep aspirin producers happy for the next decade.

The really bad thing about lack of experience is that sometimes the inexperienced man doesn't know how inexperienced he is. The gap between what a man actually knows and what he *thinks* he knows can be as wide as the Mississippi in full flood, as every gray haired college professor trying to teach philosophy to a bunch of sophomores knows to his sorrow. This attitude occasionally tempts novices to try Olympic ski slopes at Innsbruck or brides in the corned beef and cabbage class to try a cheese souffle the very night their husbands bring the boss home for supper. The story seldom has a happy ending.

Naturally, no maintenance accidents or incidents are caused by fresh-hatched mechanics who go about their jobs with the wide-eyed innocence of middle-aged schoolteachers exporing Greenwich Village for the first time. No one approaches an aircraft

Maintenance Sense

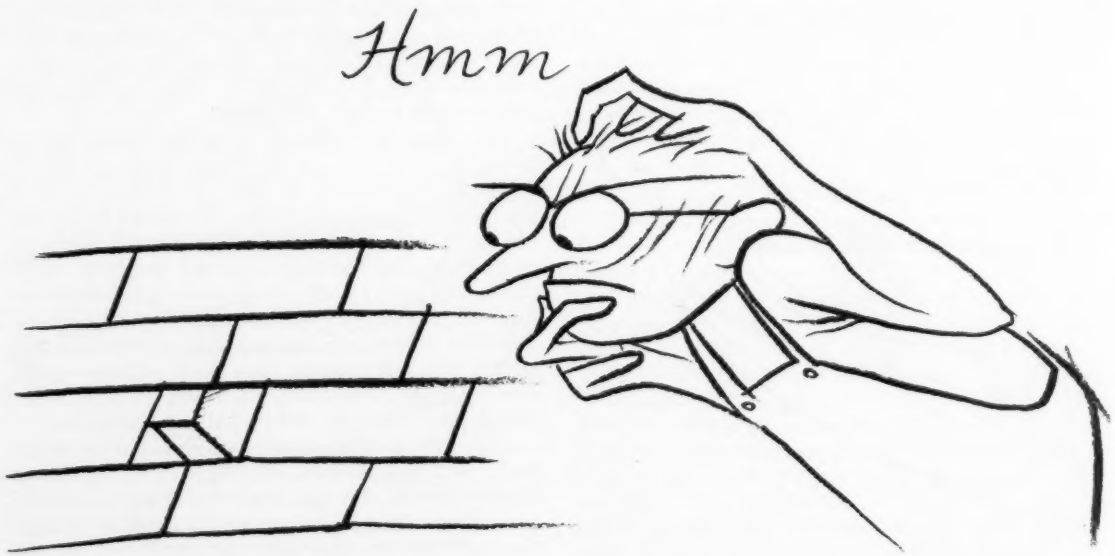
The really bad thing about lack of experience is that sometimes the man doesn't know how inexperienced he is



with the enthusiasm and general fund of knowledge of a small boy getting ready to dismantle an alarm clock.

But—the man who has gone through maintenance school or maintenance officers' school is not fully qualified, any more than the pilot who has completed pilots' school is a finished, well-rounded airman. A man could probably live to be so old he would regard Methuselah as a young whippersnapper and never become 100 percent perfect at anything from laying bricks to playing the glockenspiel. If he fails to grasp this simple truth, he may proceed

A man could live to be so old he would regard Methuselah as a youngster and never be perfect

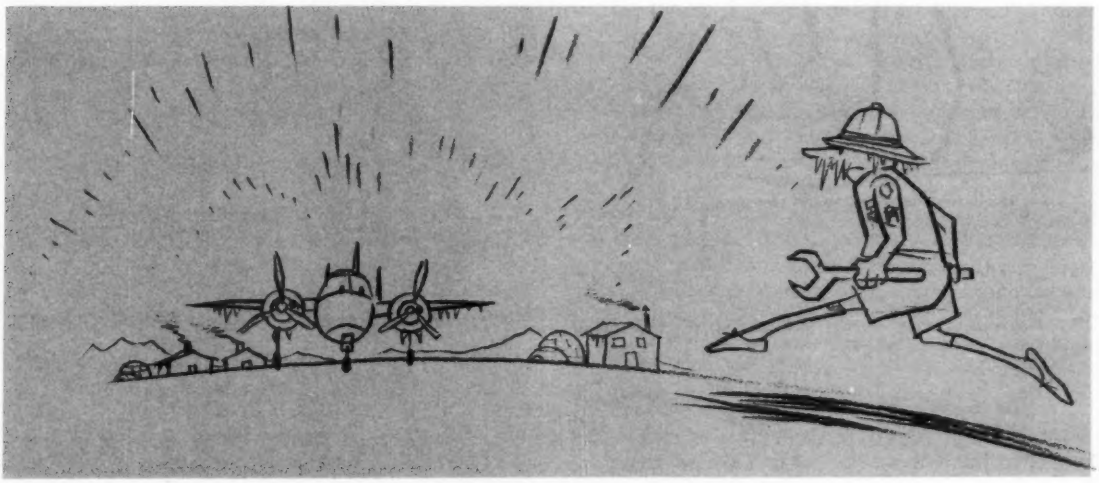


blithely ahead, getting into deeper and deeper water until he finally sinks from sight. All too often, he drags an innocent bystander down with him.

Another thing to be kept in mind in the business of maintaining aircraft is that a man who has acquired a lot of experience can suddenly be set back, like a runner tackled for a long loss or a parcheesi player being penalized two spaces.

A trained mechanic accustomed to working with a particular kind of plane may unthinkingly follow his old techniques when he is switched to the job of care and feeding a new addition to the Army's growing family, or even a new version of the old. He may be accustomed to maintenance in a sultry climate and fail to consider changes necessary when the outfit is switched to an area of the world where there are more polar bears than people. He can fail to adjust to the small, easy-to-overlook details *demanded* by a situation he hasn't been accustomed to.

The inexperience factor is compounded by an ailment common to the Army and every other expanding organization engaged in a bewilderingly large variety of complicated activities. In practically any situation, there is likely to be a shortage of fully-trained men capable of handling a particular job at the precise moment it has to be done. So the temptation is always present for the maintenance man, trying his level best, to go ahead and do the job and perhaps to overreach himself, like a taxi driver called on to deliver a baby in the rear of his cab. Sometimes the baby survives and sometimes it doesn't.



Accustomed to maintenance in a sultry climate, he fails to consider necessary changes in an area where there are more polar bears than people

BIG MAN ON CAMPUS

Maintenance errors caused by inexperience—or too much of it—tend to shrink like a snowman in a spring thaw among men who bring to their jobs a full appreciation of where they fit into the Army Aviation picture and develop a mature attitude from the start. A maintenance man can be as close to being technically qualified as it is possible to get and still never have made a thoughtful appraisal of the obligation he owes to

The Army
Aircrews and their families
Passengers
His outfit
His fellow mechanics, and
HIMSELF.

Add it all up and you get quite a burden to carry around, enough to make the responsible, mature man approach each assignment the way he would go about defusing a live bomb.

The conscientious man who ponders his obligations reaches the sobering conclusion that maintenance work is *important* work with more at stake than he would like to have on his conscience if he is led by inexperience or a wrong attitude—or anything else—into committing a needless error. We'll grant no mechanic fails to understand what improper maintenance means. It is possible some have failed to go the extra step. They may not understand the depth of their personal responsibility.

Maintenance Sense

The conscientious man reaches the sobering conclusion that maintenance work is important

Accustomed to regarding themselves as extra-small frogs in a pond about the size of Lake Michigan, as minor cogs in a mighty machine, they may acquire attitudes which keep them from looking beyond the end of their own noses at the possible consequences of even a minor mistake.

To put it baldly, a man in this state of mind does not look on his job as a challenge, a quality which makes the difference between real professionals and journeyman workers in any line of work. You can call it personal pride. All of us come equipped with it at the start, but if we acquire the feeling the work we are engaged in is about as important as pitching pennies, that one way of doing it is as good as the next, and that a lick and a promise is just as effective as a thorough performance, pride dries up like an Iowa cornfield in a summer drought.

And when a man lacks the full quota of active, wide-awake pride he needs, chances are he never develops the kind of rigid self-discipline and control we all were taught to admire in George Washington and Robert E. Lee. What he acquires instead is a set of sloppy procedures which would cause the great generals to wonder if all the effort they went to was worth the trouble.

CHIN UP — AND OUT

When you lack enough pride and enough *reasoned* self-discipline as a maintenance man, you're a ripe victim for habits which dig in so deeply you couldn't recognize them through an electron microscope. This does not mean that a self-disciplined man must go around all the time looking like an early Puritan, going to bed at dusk, rising with the dawn and never using expressions stronger than "gosh all hemlock." Being strait-laced to the point of dullness is one thing. Simple discipline which keeps a man always on track where important things are concerned is another.

Lack of self-discipline manifests itself in more ways than there are to lose money at dice. In Army maintenance work it results in

Overconfidence
Carelessness
Recklessness
Impatience
Unnecessary improvising
Guesswork, and
Speeding up.

The neat but not-so-nice thing is that the mechanic—or unit—which succumbs to one of these seven deadly ailments is likely to come down with

Some may not understand the depth of their responsibility

Personal pride makes the difference

the rest, like a patient in a weakened condition who starts out with the sniffles and ends up in the isolation ward with more diseases than there are in the medical dictionary. Get one and you get them all.

What happens next? Take tools, for example. The self-disciplined, unhurried, careful, patient mech who knows what he is doing is never pressured into using tools the wrong way. He is never guilty of whanging away at a machined surface with a ball peen instead of a rawhide mallet, of shorting across a terminal and grounding with his screwdriver, or of using pliers to tighten a fitting when the book calls for something else. He carries his tools where they should be instead of in a hip pocket. He would no more be guilty of dropping a file or a mallet in an aircraft or of failing to check his tools after he finishes a job than a surgeon would be of leaving his scalpel, forceps, and a sponge or so inside a patient. He respects his tools, not only for the constructive work they can do but also for what they can do in the way of destruction if they are not properly cared for.

All this appears about as sensible as low-heel shoes on a lady mountain climber. There is no escaping the fact that loosely handled tools have figured in a hefty percentage of Army aircraft mishaps of varying kinds. If you could assemble all the tools which have been found lying around loose in unlikely places in aircraft and which have caused all sorts of accidents, you could open up a fair-sized hardware store and not have to worry about seeing the wholesaler for months to come.

One IP at a particular installation was conked on the head by a plastic mallet which showed up in the cockpit during acrobatics like a stray flying saucer from outer space. A box-end wrench turned up tightly wedged in the aileron controls of a fixed wing trying to take off. Smoke coming from an engine nacelle led once to discovery of a stray hammer with a burnt handle. Purely by chance, none of these resulted in a real catastrophe, though the IP did not enjoy going around for a week with his head ringing like the chimes on Big Ben. Any of them *could* have caused an accident, and there have been more than enough, with similar causes, which *have*.

When a maintenance man, or a unit, lets sloppy

Overconfidence, carelessness, recklessness, impatience, unnecessary improvising, guesswork and speeding up

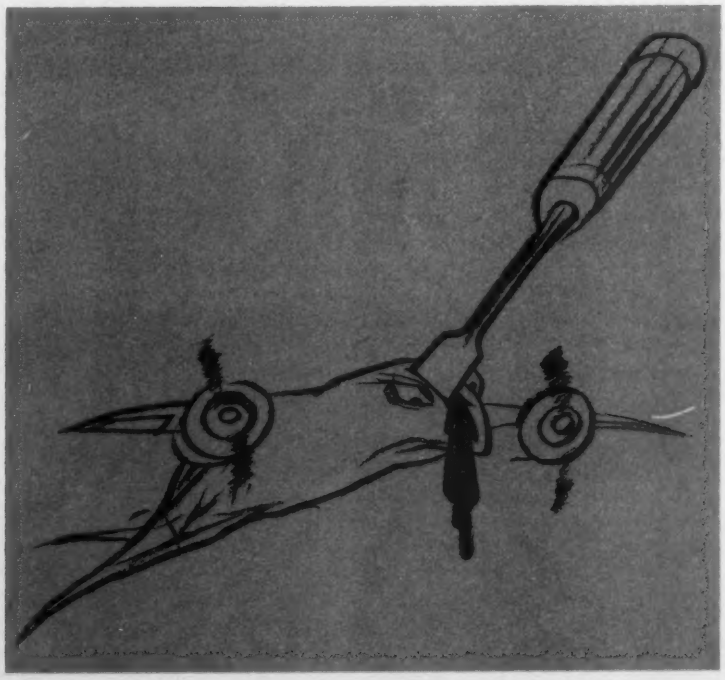
Maintenance Sense

The self-disciplined mech is never pressured into using tools the wrong way

procedures override self-discipline, things begin to happen—none the kind you like to write about to the folks back in Punkin Corner, particularly if you have played a leading and causitive role. Examples of this are as numerous as fleas on a coon dog. For instance, an engine failure cost the Army and the taxpayers a nicely-rounded $18,000 some time ago because of lack of lubrication. An oil filter cap and safety pin had been left off. A pin missing from the mounting bolts of the elevator trim push rod assembly on a Mohawk caused it during straight and level flight to carry on like a wall-eyed mustang trying to shake its rider. The pilot managed a forced landing. Things could have been much worse. They *were* much worse when a Sioux crash killed all aboard because of a missing bolt for attaching the cyclic fore and aft push pull tube.

Accidents and incidents like these occur more frequently when a unit is on field maneuvers, an indication that pressure is the deadly enemy of discipline and rigid procedures. The fact is that if something shouldn't be done at home it shouldn't be done anywhere else. Hurry-up tactics are never any good, whether a unit is at Rucker, in Vietnam, or the pine woods of North Carolina.

The words "field expedient" do not represent a magic formula designed to cure aircraft of what ails them instantly and make parts perform a function



Loosely handled tools have figured in a hefty percentage of aircraft mishaps

The pro respects his tools—what he can do with them and also what they can do to human beings and aircraft

they were not supposed to. A helicopter crashed some time ago because somebody had substituted an aluminum washer for the steel one the book called for. The good old "field expedient" had not worked. In the long run, it never does.

We can extend the list of maintenance-caused incidents and accidents longer than Rip Van Winkle's beard. We still will not get beyond the basic principle that missing cotter pins and control linkages, open turnbuckles, loose engine cowlings, tools in unlikely and dangerous places, dirty or unsettled fuel, or anything else which renders an aircraft a dubious flying proposition constitutes simple evidence that somebody—sometimes only *one* man in an outfit, which is one more than enough—has not developed enough personal control, judgment and pride to prevent his work from becoming as sloppy as a half-done custard pie.

What's the cure? Simple indeed:

> by the book, never-varying procedures,
> a supervisory program tight as the guard at Fort Knox.

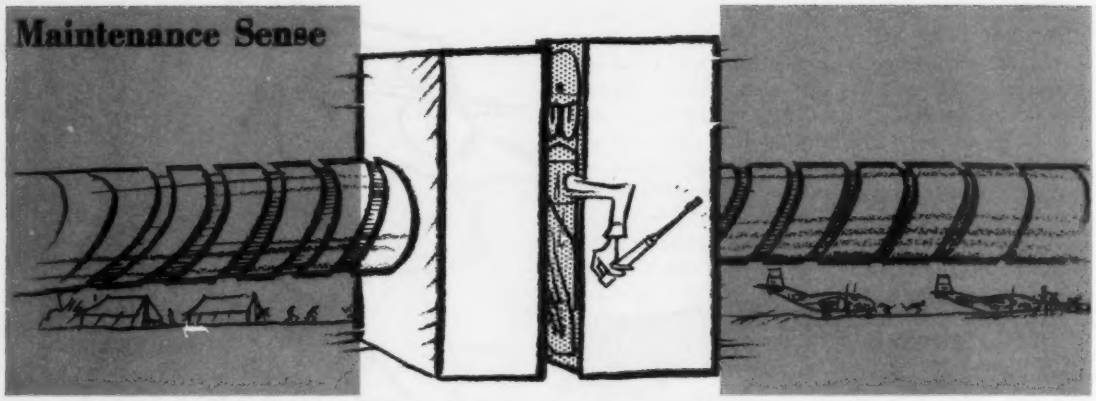
A TO Z

There are always a dozen or so good ways to get some jobs done. If you are washing the family car you can try it occasionally standing on your head, or hire an elephant from a traveling circus to squirt water on it. The result will be just about the same. The next day it will be as dirty as ever.

Servicing aircraft is a different proposition. The temptation to try innovations, to find short cuts, *to ignore the book* is there all the same. The logic behind this, if there is any, is that of an explorer who throws away the map he has because all those squiggly little lines representing roads fail to go directly to the hidden treasure. The lines squiggle for a reason—to avoid lurking dangers such as crocodiles and cannibals who spend most of their time arguing whether explorers taste better roasted or baked in raisin sauce.

Every aircraft has a –20 prescribing the *proper* way it should be cared for. Sometimes there may be a *better* way than the –20 indicates. Just perhaps. You can be certain there are a couple of hundred *worse* ways. By sticking to the book, a maintenance man is playing the safe and sane *disciplined* way, which guarantees the finished task will meet the requirements.

Following the –20 to the letter in every case provides a mechanic with a safety valve against sloppy procedures. There is no chance for deviation



Pressure is the deadly enemy of discipline and procedures

and no chance the task he is engaged in will not be finished the way the book calls for. With the book in hand, the mechanic starts at point A and proceeds to point Z by way of points B, C, D, and the rest without skipping a step. If he is interrupted anywhere along the line he goes back to A and starts over. It may not make for as adventurous a life as that of Secret Agent X-9, but it is the mark of a Solid Citizen who is fully aware that if he follows the book and never steps off the straight and narrow he will never have to worry about whether something he did or didn't do caused the crash which permanently removed one more good pilot from the Army's roster.

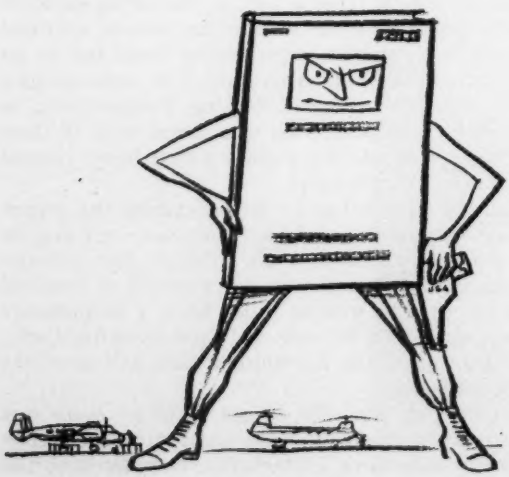
In every case when he is servicing his aircraft, our Solid Citizen

Follows the book
Tests the system
Gives it a check, and
Has it inspected.

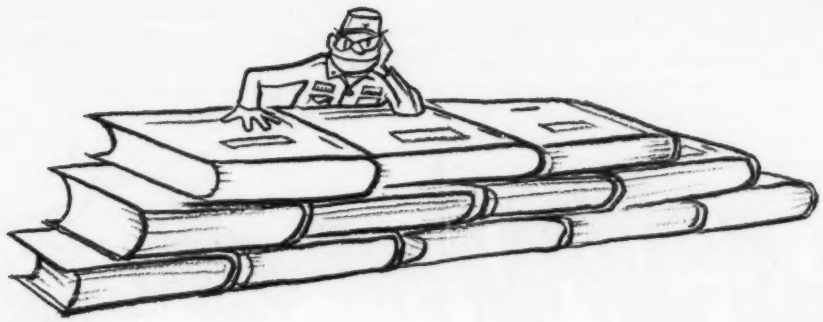
BACKSTOP

Which brings us to the second large area of maintenance work. You can discipline a man to the point where he will make one of Napoleon's horse guards look like a tenderfoot and still not remove every chance he will commit an error. Everybody in any responsible line of work needs somebody to

Every aircraft has a —20 prescribing proper maintenance . . . follow it to the letter



In the long run, the good old "field expedient" never works



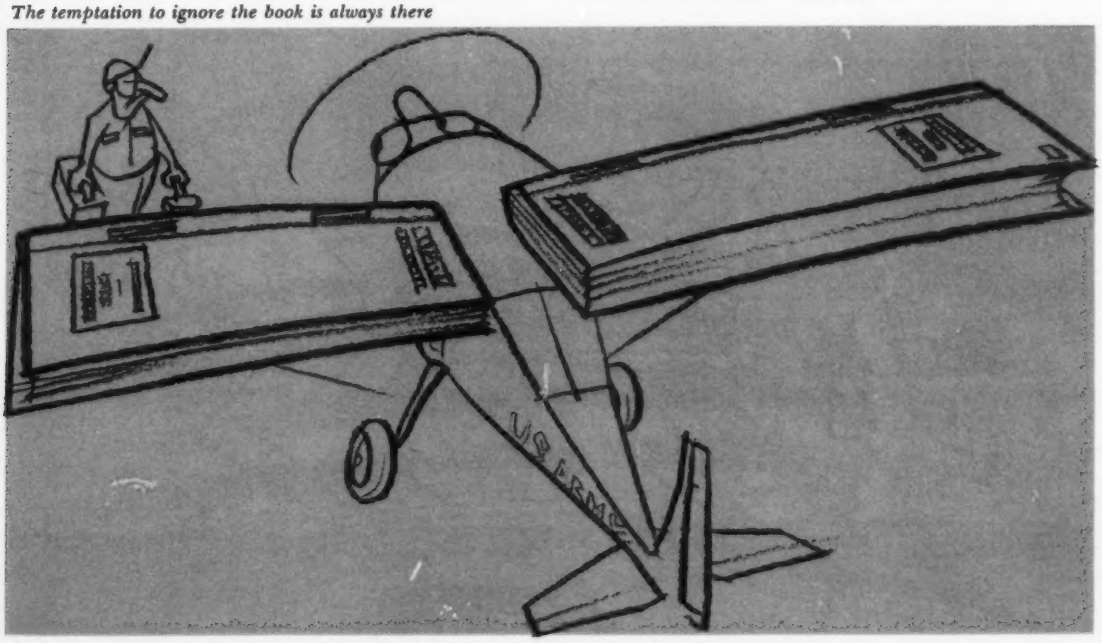
They're safe as a brick church

check on him, regardless of how painfully honest or conscientious he may be.

The Army's supervisory system—*provided it is working with the precision of a metronome*—not only ensures that rare errors by disciplined men are caught, but it also stamps out mistakes by maintenance men who are not yet fully trained or have not yet been impressed with the importance of their jobs and the need for discipline and standard procedures.

If this were the only factor, a seal-slick supervisory system would be more than worthwhile. There's a great deal more. A supervisor's quality and standards and the effectiveness of the program is *directly* reflected in all phases of maintenance. Take the simple matter of the red X on the form, something not all maintenance men understand. The good supervisor impresses on the mechanic the fact that the red X is not called for by evident removal of parts while the aircraft is still being worked on, but that if the part can be put back in such an improper way as to cause a hazard it must be entered on the form to ensure inspection by a qualified supervisor. The supervisor-conscious mechanic who

The temptation to ignore the book is always there



Maintenance Sense

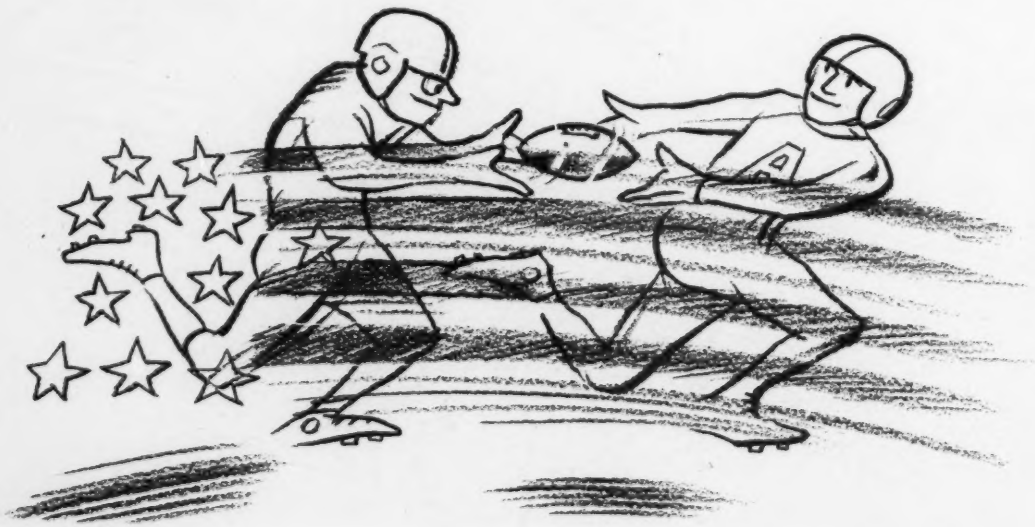
Every maintenance caused accident is totally preventable

puts down the red X is saying that in his opinion there *could* be something wrong with the aircraft which *might* make it unsafe to fly and that he wants somebody to doublecheck. He's proud and confident of his work. He wants to make sure.

Nobody wants to gamble with another man's life. The working supervisor program makes sure he doesn't have to. No mechanic should be resentful when a pilot makes a preflight on an aircraft he has serviced. He knows the preflight is an essential part of the entire supervisory program and that the pilot who skips one is betting his life on another man's work.

When a supervisory program is functioning properly, it goes a long way toward overcoming a lack of trained men by providing them with encourage-

There is no reason why maintenance work can't come close to perfection



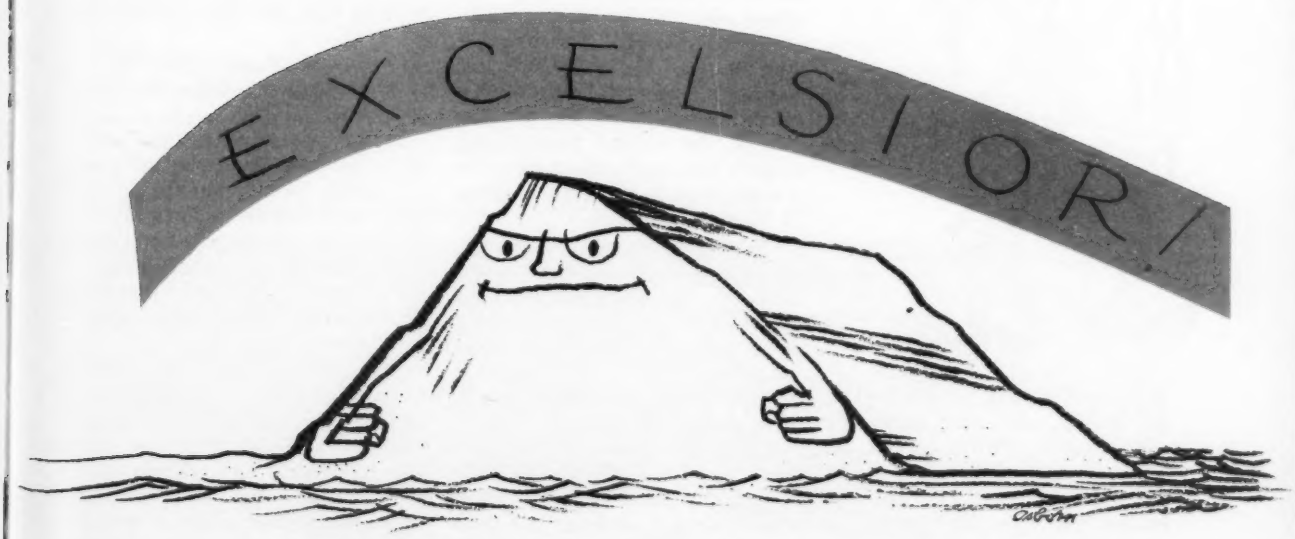
ment and motivation in their jobs. Every mechanic assigned to an aviation unit is as anxious to please as a two-months-old puppy and develops in his job if directed the proper way. He profits from his mistakes if he has them analyzed for him by a supervisor. He appreciates orders if they are directly and clearly given. He becomes impressed with his job's importance. He *participates.*

ALL AMERICAN

There will never be any such animal as the ideal mechanic. On the other hand, there is no reason why maintenance work can't come about as close to perfection as it is humanly possible to get. It will reach that point when all maintenance personnel—mechanics, crewchiefs, maintenance officers, and supervisors—fully appreciate the fact the work they are engaged in is a really critical area in which there can be no such thing as second best. *Most* maintenance men know this already. *All* should.

The crack Army maintenance man is the conscientious, rock-steady sort who makes up for any deficiency in training and experience by the exercise of caution and prudence. He is constantly seeking to improve, he is always concentrating on what he is doing, and when he does make a mistake he profits from it. Above all, he never loses sight of the fact that

The Kind of Maintenance the Army Must Have Comes Only From Unswerving Devotion to the Highest Possible Standards



There is no reason why maintenance work can't come close to perfection

Once A Knight's Enough!

FORSOOTH," sayeth the knight, and rose from the round table. "Mine IN basket hath emptied into the proper channels. Now is the time to mount the iron bird and soar forth. The month end approacheth and I am short the fourth hour."

So saying, the warrior arose from his desk, zipped into his armor and left that place of cubicles. He traveleth to the place of the roaring birds, signeth the necessary forms and strappeth on a great brown canvas bag. Striding around the winged monster, he pulleth here and poketh there in a manner to checketh the firmness of the fowl's feathers.

Seemingly pleased with the condition of the beast, the knight mounted and did various things to the bird's interior which caused it to roar and shake. It waddled off to a stretch of black earth, took a running leap and soared upward with a rush of wind.

And there cometh a feeling of great joy to the knight. He zoometh around the sky with abandon until an hour had gone and it were time to returneth the bird. The warrior descended from high places and flew beside the black earth, causing the bird to cease its roar. He turneth it toward the lighting path and pulled down some feathers along the back of each wing. As the bird approached the ground, it was seen that one wing flew lower than its mate. Some said this was because the wind blew across the black earth.

The bird alit on one foot, whereupon it launched itself into the air again, turned its nose into the wind, and lit hard to the extent that its legs spreadeth on the hard ground. Its whirling nose bit angrily into the black earth and the beast cast one wing down and slid along on its belly. The iron monster came to a grinding halt and a great quiet descended upon that place. The knight dismounted and woefully regarded the crumpled bird.

And there came a troop of rolling cavalry calling themselves investigators, and they took measurements and did all manner of things to the broken bird. And all who witnessed the falling of the bird were called and spake long to them and they writeth in the book.

Then, he of the gray beard spaketh to the knight in this manner:

"Verily, verily, I say unto thee, thou hast lost all directional control and it were better that thou hadst taken this bird again around! It is written that he who bounceth shall encounter the crooked path. 'Tis far better to push the throttle than boot the rudder, for the spur is quicker than the rein.

"However, the records of thy form indicate thou hast only seven and a half hours of bird time in the last half-year. For this, thy supervisor shall be called to task.

"Go, and when thou comest again to the bird, bring the senior knight that he may instruct thee how to alight thy bird with safety."

Need a landing area for a CV-2B?

Any "Matchbox" Will Do!

DURING THE Allied assault on Rome in World War II an Army Aviator landed his L-4 in a tiny schoolyard surrounded by an 8-foot brick fence, picked up General Mark Clark and flew him back to his command post.

Today's Army Aviators are still landing airplanes in "matchbox" size schoolyards when required—and just as during World War II, they consider such accomplishments as routine.

The latest "schoolyard episode" occurred last February in the Republic of Vietnam when CV-2B aircraft were used to establish a forward resupply point in the vicinity of Xuyen Moc in the province of Phuoc Tuy.

The mission originated when the 61st Aviation Company (FW) was requested to pre-position ammunition and fuel for the resupply of UH-1Bs participating in a III Corps operation against the Viet Cong.

Reconnaissance revealed that the landing area would have to be an old schoolyard about 1,000 feet long and 135 feet wide. Powerlines about 20 feet above the ground were located at each end of the area (those to the south were removed before landings were made), and an antenna farm with 30- to 40-foot masts was located on the north end. The landing area was a gradual downhill slope toward the south, and a few large holes had to be filled. The III Corps forward command post was located alongside the landing area and provided ground-to-air FM communications.

The first mission took off from Vung Tau with about 3,950 pounds of cargo, consisting of seven 55-gallon drums of JP-4 fuel, 7,000 rounds of 7.62 mm ammunition, and thirty 2.75″ rockets. At the landing area surface winds were generally out of the south at 15 to 20 knots. Temperature was estimated to be 82° F and the density altitude plus 3,000 feet. The pilot elected to land to the southeast to take advantage of the winds even though this approach would place him over the higher barriers on the north end of the field.

A normal STOL steep approach was made to the field using 40° flaps. The first landing attempt was aborted due to personnel walking across the field, but the second was successful. It was estimated that 700 to 800 feet of usable runway was available after clearing the barriers. Reverse pitch and maximum braking was employed and the aircraft came to a safe stop with about 200 feet of runway left. On the return flight the pilot estimated that only one-half of the runway was used during the takeoff roll.

The next day another mission was flown successfully with about 5,000 pounds of cargo, consisting of twelve 55-gallon drums of JP-4 fuel and twenty 2.75″ rockets. This time the takeoff was accomplished with a cargo of 15 empty gasoline drums.

Although the success of this mission reflects the excellent training and skill of the personnel involved and the 61st Aviation Company, the pilots themselves and the unit commander view it as an ordinary mission.

Forward resupply point and CV-2B landing area—about 1,000 feet long, 135 feet wide

Experience and training are evident in the actions of this crew during their emergency. In the words of another aviator, the three men

"...worked as a team"

Captain Louie A. Barber

THE CV-2B WAS on the last leg of a routine flight returning from Eureka, Calif. I was the additional pilot to a crew of three on the aircraft, which is normal for long flights to help reduce pilot fatigue. On this particular leg I was sitting up front in the passenger compartment. This was an excellent position from which to observe the performance of the crew as well as listen to what was being said. I had my helmet on and connected to the second intercom jack.

We took off VFR from Lake Charles, La., just ahead of a front that was moving into the area. Because of the overcast, our altitude was less than 1,500 feet above the terrain.

Approximately an hour and a half after takeoff, the no. 2 engine, zone 2 and 3, fire warning light suddenly came on, followed by a sharp crack. The crewchief immediately looked out the right front window and verified the fire. The pilot and copilot both agreed that the aircraft must be landed as soon as possible.

Within seconds, the pilot said he had picked out his field. During the short time of picking the field and setting up the approach, both the copilot and crewchief were busy. Realizing that with the flames blowing back into the wheel well the gear should be lowered, the crewchief shouted, "Get the gear! Get the gear!" The pilot did.

The copilot methodically went through the emergency shutdown procedure as though it were only practice. He said, "I'm going to feather." Then he waited with his hand on the feather button until the pilot said, "Yes, O.K.!" Each step was executed in this same positive manner with no show of emotion in his voice. Once he said, "Sir, your airspeed is getting low."

On short final it looked as if we were going to land in some small evergreen trees. The pilot waited until the precise time to call for flaps. The momentary lift enabled us to clear the trees and a fence. We touched down about 20 feet beyond the fence, stopping in less than half the useable field length. The crewchief was so intent on watching the engine, I had to pull him over to his seat to get him tied down with a seat belt. The landing could not have been better.

All passengers evacuated the aircraft unhurt. The copilot and two enlisted men used the three fire extinguishers aboard the aircraft to put out the fire. One cylinder had been blown completely off the engine and was sticking through the cowling.

Any person doubting the need of three crew members for the CV-2 would doubt no longer if they had been in my shoes on this flight. Eleven men arrived safely because three men worked as a team to overcome a precarious situation.